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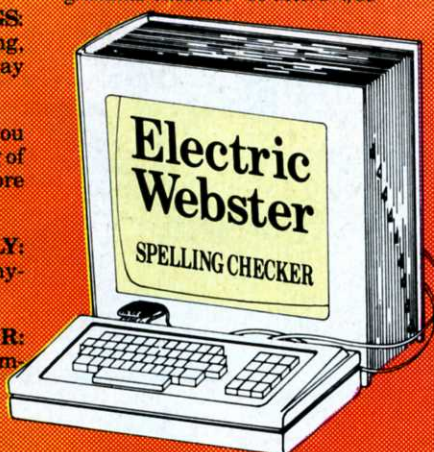
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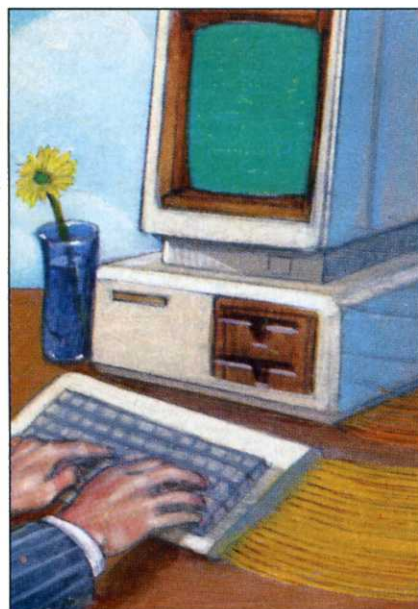
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The 80 Micro Disk Series (formerly Load 80)

The 80 Micro Disk Series gathers together selected programs from this issue of 80 Micro and puts them on a magnetic medium for your convenience. It is available on disk and runs on the Models I, III, and 4.

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tions. If you own a Model 4, copy the Model 4 programs from the Series disk to your TRSDOS 6.x disk using the Copy command.

Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly disk subscriptions to The 80 Micro Disk Series are \$149.95. Individual loaders are available on disk for \$17.95, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to The 80 Micro Disk Series, 80 Elm St., Peterborough, NH 03458.

Directory

Time Stamp

Article: Caught in a Time Stamp (p. 65).

System: Model 4, 64K RAM; Models I/III with changes.

Let TRS Stamp time-stamp your Basic programs for future reference.

Language: Basic.

Filespec: TRSSTAMP/BAS.

Quick Comparison

Article: A Quick Comparison (p. 69).

System: Model 4, 64K RAM, TRSDOS 6.2, Pro-Create editor/assembler (optional); Model III, 48K RAM, LDOS 5.x, EDAS editor/assembler (optional).

Compare Plus lets you display two text files simultaneously and compare them line by line. Filespecs: CED/ASM, CED/CMD; CED3/ASM, CED3/CMD.

Easy Conversion

Article: Data-Statement Generator (p. 80).

System: Models I/III/4, 32K RAM.

Use Datapoke to convert assembly code to Basic Data statements with checksums.

Language: Basic.

Filespec: DATAPOKE/BAS.

BAS = Basic, ASM = source code, CMD = object code

File Removal

Article: Strip Your TRSDOS (p. 84).

System: Model 4, 64K RAM, TRSDOS 6.x, Pro-Create editor/assembler (optional).

Remove unprotected files from your system disks in one step.

Filespecs: REMOV4/ASM, REMOV4/CMD.

Pop-Up Printer Codes

Article: The Next Step (p. 103).

System: Model 4, 64K RAM, editor/assembler (Pro-Create 4.3a or MRAS), Pro-Wam.

Use Pro-Wam pop-up utilities to access your printer's special features, such as double-strike mode and changeable fonts.

Filespecs: PRSET/ASM, MACLIB/ASM.

Checksum

Article: How to Use 80 Micro Program Listings (p. 116).

System: Models I/III/4, 32K RAM.

Use our checksum program to check the accuracy of the Basic listings you type in.

Language: Basic.

Filespec: CHECKSUM/BAS.

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Games That Once Were

You newcomers to Tandy computers might not believe it, but there actually used to be a market for TRS-80 games. That was before low-end computers with color and higher-resolution graphics siphoned off all the game players and relegated the III/4 to a dark street where only serious users dwell.

In the halcyon years—from around 1980 to 1983—80 Micro took its games seriously. Game-playing was part of the staff's daily routine. We even once took a day off for a game decathlon.

The readers were as enthusiastic. Our annual games issue was the most popular of the year. We featured a monthly column called The Gamer's Cafe and were deluged with entries for our one-line game contest.

I stopped playing computer games when the TRS-80 game market went down the tubes. I'm sure my waning interest had something to do with maturity (one of the hazards of growing older). But also, I didn't like the fancier games that ran on the Apple, Commodore, and IBM machines.

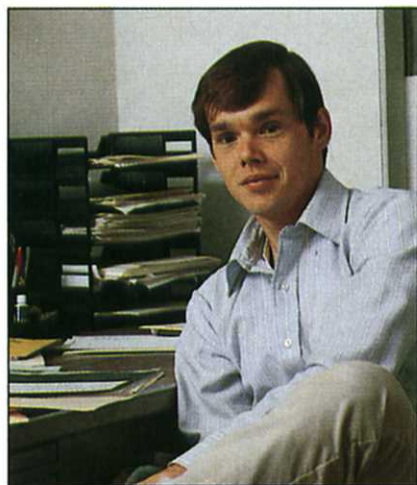
Stripped to their essentials, all arcade games are the same. You control a clump of pixels that try to avoid or hit other clumps of pixels. You can call these clumps space ships or swamp monsters. You can make them move faster or slower. You can give the player different rewards for his dexterity. But they're still nothing more than glowing, moving phosphors.

Minimalist Gaming

TRS-80 games were closer to the pure essence of gaming. The machine's graphics weren't good enough to give you anything more than abstract representations of objects. A space ship didn't look like a space ship—it looked like two or three rectangles stuck together. You only knew it was a space ship because the program's author told you so. The rest was up to your imagination.

Games these days come with entire manuals that you have to study before you can play. The best TRS-80 games had one line of on-screen documentation: "Arrows to move, spacebar to fire." After that, you were on your own, learning the game's weaknesses, honing your maneuvering skills, and practicing your shot until you became good enough to make the high-score board.

80 Micro's one-line game contest in



1983 demonstrated the wonderful simplicity of TRS-80 games. In a quarter-K of Basic code, programmers wrote games that had all the elements of a 20K assembly-language program. I still occasionally boot one up. My favorite is a Model III Cram-like game called Snakearound, which you'll find in the Program Listing.

Arcade Archives

Of the 100-plus Model I/III games I collected, my favorite was Big Five's Galaxy Invasion (the original, not the Plus version). GI was typical of so many TRS-80 games. Rows of battleships swooped from the top of the screen and you shot them. There was a time when my sole object in life was to reach 1 million. I finally did it one Saturday afternoon. GI had no pause key, so it took me seven non-stop hours. The game ended in disappointment—at 1 million, the score counter simply started over. No flashing messages, no bonus points, no recognition of the achievement.

I also liked Adventure International's Armored Patrol, certainly one of the

most surreal computer games ever made. You were the commander of a tank, the screen serving as your window. Your object was to fight enemy tanks in a flat, barren wasteland rimmed by craggy mountains (it looked a bit like parts of Utah). The landscape was dotted with houses that you couldn't drive or shoot through. Of course, you also had to fight off energy-sucking robots from outer space. And every once in a while something odd would happen, like one of your shots disappearing over the horizon and suddenly whizzing past you from behind.

Armored Patrol was a tough game until a reader notified us of a fatal bug. If you put your tank at a certain spot, the robots would come straight at you and let you mow them down. We leaned a coffee cup on the spacebar and broke the office record by 200,000 points.

Blasts from the Past

Other games that were hits at 80 Micro included Swamp War from Instant Software, Bable Terror from Funsoft, Eliminator from Big Five, and Sea Dragon from Adventure International. We've only added a few to that list in recent years. A Model II game called Wormy caught fire for a while until we ran out of room for the Model II. And Rapidynamic Software put out a cute little Model 4 game called Dog Catcher (Rapidynamic was the only company I know of that produced arcade games for the high-resolution board).

The TRS-80 was as suitable for games as a bus is for drag racing. But then, that was part of the I/III's appeal—making it do something it wasn't supposed to do. Too bad people can't stay satisfied with the simpler things in life; TRS-80 games might be more than just dusty bytes on a shelf. ■

Program Listing. Snakearound.

```
10 N=128:F=16:X=64:Y=24:CLS:FOR T=1 TO N:SET (RND(127),RND(47))
20 A=(PEEK(14400)AND120)/4:F=(A=0)*F+A:D=FAND6:C=(FAND24)/4
30 X=X+C+3*(C>0):Y=Y+D+3*(D>0):X=X+N*((X>N)-(X<0)):Y=Y+48*((Y>47)-(Y<0)):IF POINT(X,Y) CLS:PRINT "SCORE:"PELSESET(X,Y):P=P+1:NEXT
40 REM SNAKEAROUND BY BILL PETERS
50 REM 2470 CAMELBACK ROAD, SALT LAKE CITY, UT 84121
60 REM ARROW KEYS TO MOVE--AVOID OBSTACLES AND YOUR TRAIL
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End

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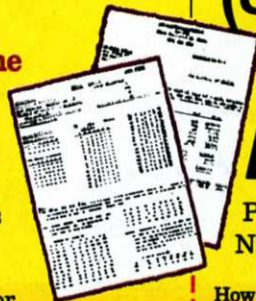


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- Upward compatible with TRSDOS 6.x versions.
- Expanded date range, 1980 through 1999.
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- The directory display shows file dates and times.
- New SVCs for screen print and decimal display.
- All new, easy to use full screen ASCII text editor.
- Conversion program for pre-6.3 version disks adds new time/date information.
- Automatic date/time conversion when copying from TRSDOS 6.x to version 6.3.
- One pass format and disk duplication program.
- Variable and line number cross reference utility for BASIC programs.
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To provide support only to legitimate owners, all LS-DOS 6.3 master disks contain an individually encoded customer service ID and serial number. This entitles customers to support directly from LSI.

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The Latest on TRSCross

While we appreciate David Engelhardt's four-star review of our product, TRSCross (February 1987, p. 98), we want to clarify a few points.

Mr. Engelhardt reported that TRSCross does not convert Basic programs accurately. We do not claim 100-percent conversion accuracy. We have, however, improved the accuracy of our later versions of TRSCross, the current version being 1.30.

Mr. Engelhardt also reported that you must convert Superscript files to ASCII format before TRSCross will accept them. Although our early advertisements and manuals stated that you had to perform the conversion, we removed the restriction before we introduced the program. TRSCross is, as far as we know, the only program on the market that performs the conversion automatically during a copy.

We found that the additional conversion step that Mr. Engelhardt stated was necessary to convert Model 4 disks is only required with TRSDOS versions older than 6.2.1.

Dennis Brent, President
Powersoft Products
Dallas, TX

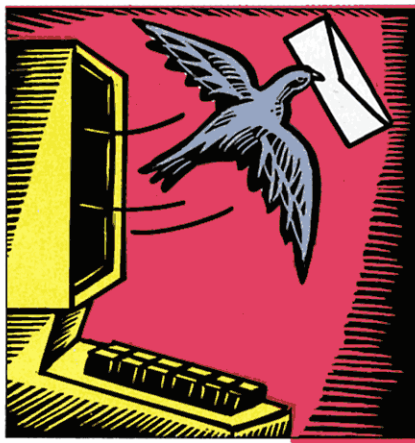
Checking Out Memcheck

I read Mark Goodwin's review of our Memcheck utility (February 1987, p. 101) with great interest. I want to correct a few misunderstandings regarding the program.

Mr. Goodwin assumed that a computer's memory is installed by a technician. Many less-qualified people are trying to save money by installing their memory boards themselves and often encounter problems soldering the connections. Memcheck can help these people find the bad connections.

Mr. Goodwin claims that once you correct the connections, you will not have further use for Memcheck. Hardin Brothers pointed out in his review of Supermem (January 1986, p. 35) that moving a computer that has memory upgrades can loosen connections to the main memory board. If this happens, you will be glad to have a diagnostic utility like Memcheck on hand.

I regret that I neglected to note in the



Memcheck documentation that the utility is only compatible with the Alpha Technology Supermem expansion. Mr. Goodwin tested it with a Seatronics upgrade.

We have released a revised version of Memcheck that only supports memories of 256K or more using Alpha Technology's Supermem upgrade. The new version is faster and should correct the problems of the earlier version.

Michael Snyder
RSI Software/
Rattan-Snyder Investments
Deltona, FL

Stepping Out

Would you consider publishing a compendium of Hardin Brothers' The Next Step column? I am sure that many of your readers refer to the columns as often as I do and would appreciate such a convenience. I would also be grateful for a series of articles (not reviews) on LS-DOS 6.3 and LDOS 5.3.

R. Hollenbeck
El Paso, TX

We have no plans to compile Hardin's columns, but we do have material on LS-DOS 6.3 and LDOS 5.3 in the works.

80 Micro's BBS is open 24 hours a day. It offers programs you can download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1,200 baud, 8-bit words, 1 stop bit, no parity.

Emulator Boards?

In your Side Tracks column of November 1986 (p. 8), you mentioned that several manufacturers are considering making a Model 4 emulator board for MS-DOS machines. We have over 1,000 Model I/III/4 programs and hope to avoid the task of converting them to MS-DOS. Please keep us posted.

Robert Ledee, Treasurer
Orange County TRS-80 Users Group
Lake Forest, CA

Warehoused Wonders

In the February 1987 issue, you said that Multidos is no longer available (p. 96). Diskcount Data advertises Multidos on p. 2 of the same issue.

Robert Hales
Albion, NY

Thanks for pointing out our mistake.—Eds.

Continued Support

I have renewed my 80 Micro subscription because my Model III is being supported less and less as MS-DOS machines continued to gain popularity. My Model III does what I want, and I see no reason to upgrade.

George Phillips
Sun City, AZ

Printer/Typewriters?

I have seen several new typewriters in office equipment and department stores that can be interfaced with computers and used as printers. I have not, however, seen any mention of these machines in 80 Micro. Would you consider publishing an article or series of reviews focused on printer/typewriters?

Gerald Stegried
Reading, PA

Early printer/typewriters were slow and expensive. Perhaps it is time we took a look at what's available now. Thanks for the idea.—Eds.

Send your correspondence to Input, 80 Micro, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.

Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Elm St., Peterborough, NH 03458. Please include a self-addressed, stamped envelope and daytime phone number.

What a Character

Q: How can I use the European characters of my DMP 200 printer with Disk Scripsit on my Model 4P? (Klaus P. Winter, Fort Worth, TX)

A: The best way to access these characters is to use a word processor that supports extended codes. Both LeScript and Superscripts support user-defined character codes. Another way is to use Clifford Knight's Scripsit program ("Model 4 Scripsit the Write Way," January 1985, p. 60), with which you can assign control codes to output desired characters on Model 4 Disk Scripsit.

Printer Support

Q: Loading Superscripts into my Models 4P and 4D somehow eliminates any print-mode commands to my printers (an Okidata 82A and a Gemini 10X). I cannot use the double-width, condensed print, or any other modes on either printer. I contacted the printer manufacturers and the printer-driver company. They all tell me that there is something in Superscripts that overrides my commands for changes in print mode. Since I use these machines to prepare manuscript materials, this is a serious problem for me. (George Manolakes, Westfield, NJ)

A: You can alter Dan Robinson's "MX-80 Driver" (May 1983, p. 125) to support the Gemini 10X and 15X printers with changes that Kenneth D. Grimm provided in the April 1984 Reader Exchange (p. 30).

Out of Control

Q: I have Superscripts 1.01.00, and a DMP 130 printer. Occasionally, when I am typing a document, the program spews a jumble of words onto the screen. Another peculiar thing is that sometimes the printer starts feeding the paper backwards when I try to print a document. Each new line prints above the last.

The printer also seems stuck in elongated print mode when I use Superscripts. I have the user keys programmed to



change type modes. Clear-shift-1 is the command to change the modes. If I don't use it when I call a document or create a new document, the characters print in elongated mode. (Robert Rowe, Port Charlotte, FL)

A: Are you using the DMP130/CTL driver with Superscripts? It is available to registered Superscripts owners at no charge from Radio Shack (catalog no. 700-2294). If you are, your copy of Scripsit or one of its support modules might be defective. You can go to Radio Shack with your original disks and copy the files from one of the store's disks onto yours to ensure that the software is not the problem. (The latest version is 1.1.3—check Radio Shack's update book if you have an older version.)

You should also run a memory-test program to ensure that you do not have a faulty RAM chip. Memtest/CMD on the TRSDOS 1.3 system disk should do the job. If these methods do not reveal your problem, check your cable connectors for corrosion. Use a pencil eraser to clean the contacts.

Be careful not to accidentally hit the control key or type too fast. If you type very fast, the TRSDOS 6.x keyboard driver might interpret a multikey combination as another single-key code or a control sequence. Similar problems arise if you accidentally hit control.

Escape from NLQ

Q: I am using Superscripts with a Model 4P and a DMP 130 printer. I often want to print without using the near-letter-quality (NLQ) mode because it is slow. There is no option in Superscripts to disable NLQ. Can you tell me how to do it? (W.M. Staudenmaier, Wakarusa, IN)

A: One of the easiest ways is to use a printer driver that supports a printer without NLQ mode, such as the DMP 120 driver. Such a driver does not support separate data- and word-processing modes. Your DMP130/CTL driver is automatically setting up your printer for NLQ each time you select a manuscript task.

No Access

Q: I have Scripsit for the Model I, which I have converted to run on my Model III. I can run it on my Model 4 in Model III mode, but I can't get it to print on my Okidata Microline 80. (Delbert Roberts, Mason City, IA)

A: If you have simply copied Scripsit/LC from the Model I disk to your Model III disk, the program runs but cannot access the printer ports. You must convert all sequences of 32E837 hexadecimal (hex) to D3F800 hex within the program.

Model I Scripsit sends all data out to its printer-interface address at 37E8 hex, but Model III sends data to the printer via port F8 hex with the command OUT (F8H).A.

Put C9 hex at address 4203 hex to prevent the break vector from crashing the program.

Address Change

Q: I have a copy of the Radio Shack Assembly Language Tutor on tape and am trying to use it with my 48K Model III and four Tandon double-sided disk drives.

The program works fine on tape, and I have successfully converted the first part to disk with TRSDOS 1.3's tape-to-disk utility. I cannot, however, copy the rest using either TRSDOS or Basic. The program works in Level II Basic, but it loads as ALTC/CMD in TRSDOS. When I try to run it, it immediately reboots TRSDOS.

I've unsuccessfully tried to load the other parts of the tape into Disk Basic. In TRSDOS, the Tape function starts, but gives me an error 11 (illegal function call). If I try to load ALTC/CMD file from Basic, I get the message "Direct statement in file."

Can I convert this program to disk? I have a hunch that it occupies the same place in memory as TRSDOS. (Ron Folkert, Benton Harbor, MI)

A: It looks like the program operates in the DOS area (4000-41FF hex) or con-

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tains code within that area. To load it from a DOS disk, you must relocate it to a higher memory address, out of the way of DOS. That way, the program does not overwrite the DOS when it loads. You must append a small subprogram that disables DOS, loads the program down into its operating environment, and executes it as though it had been loaded from tape.

Newdos/80 has a program called LMOFFSET, and LDOS has one called CMDFile, both of which do those operations for you.

Hung-Up on Fortran

Q: Our high school recently purchased Fortran IV from Radio Shack. I use the TRSDOS 6.2.1 operating system. Logical variables do not seem to work. The computer hangs up, and I can't do anything except reset. Can Fortran sort strings easily and effectively?

When I format my read statement as A4 hex, it sorts on the fourth character (A8 hex sorts on the eighth character). I'm sure the routine is correct. Can I add Set, Reset, and Point to Model 4 Basic? Is there a graphics sheet for the Model 4? (David Meier, Reedsville, WI)

A: Where are you getting your samples and instructions for logical variables? Most instructional materials and tutorials are geared toward Fortran 77, whereas the Radio Shack (Microsoft) version is an implementation of Fortran IV. Make sure to set up your logical operations to satisfy your compiler's requirements. I have not had problems working with logical operators.

String manipulation in Fortran is possible, though difficult. Fortran was primarily designed to solve complex mathematical equations, not to manipulate text strings. Strings are better handled by such languages as Lisp and Basic.

You can regain Set, Reset, and Point on the Model 4 by using Alan D. Smith's program in "Upgraded Graphics" (August 1985, p. 76). There is a sample graphics sheet in appendix G of the Model 4's *Disk Systems Owners Manual* for TRSDOS 6.x. Note that you can break each block into six pixels.

Date Update

Q: I use a Model 4D with DeskMate and TRSDOS 6.02.01. I am distressed that the only sign-on dates allowed are from Jan. 1, 1980, to Dec. 31, 1987. Is there a patch to disable the check of validity of the year, even if it means calculating the wrong day of the week? I keep records on DeskMate and am concerned about maintaining my sequence of date references in the directory after 1988 begins. I also write programs in Basic and want

to keep track of my program updates with the directory. (Thomas McClellan, Fort Worth, TX)

A: A new version of TRSDOS, called LS-DOS 6.3, is available from Logical Systems Inc. (LSI), P.O. Box 55235, Grand Junction, CO 81505, for \$29.95. Unfortunately, a patch to TRSDOS 6.2.1 is not enough. To make room for the new dates from Jan. 1, 1988, through Dec. 31, 1999, LSI removed the user password. LS-DOS 6.3 date- and time-stamps files when you create or update them.

Out of Line

Q: I use Superscript 1.3.1 on a Model III. If I adjust the margins after opening a file and then print out text that is supposed to be justified left and right, the first line of each paragraph prints ragged right. How can I correct this? (Gideon Oren, Milwaukee, WI)

A: I duplicated your problem by assigning the pitch setting in the Open Document Options field to a value other than P, such as 10 or 12, which indicates monospace mode rather than proportional spacing. I then made sure that the method of justification in the Print Text Options field was set to P for proportional spacing.

The odd justification in the first line is due to a conflict between the two settings. If your printer can do proportional space printing, then change the open-document option to P. If it cannot print proportional spaces, then set the print-text option setting to M for monospace printing.

You can set these options to user-defined defaults by going to the system-setup menu from the main menu when you first enter Scripsit. You must set the print-text option to M if you use the specified-pitch-value setting. The print-text option must be P if you use proportional spacing.

Scripsit Indent

Q: Resetting the paragraph-indentation parameter each time I use Model III Disk Scripsit is boring. What patch sets the default indentation? (Richard Yoder, Redding, CA)

A: Scripsit sets the paragraph indentation during initialization. The following are patches for the Model I/III/4

versions of Disk Scripsit:

For the Model I running TRSDOS, use the Program Listing. For Model I LDOS, use:

PATCH SCRIPSIT/LC (D=00,B1=00)

For Model III Scripsit, use:

PATCH SCRIPSIT/CMD (ADD=5373,FIND=05,CHG=00)

For Model 4 Scripsit, use:

PATCH SCRIPSIT/CMD (D00,C8=00:F00,C8=05)

Change the 00 assignment value to any hex value you want from 00-84 (zero-132 decimal).

Incompatible Keys

Q: As a relatively new Tandy 1000 user, I am still learning much about this fine computer. I use many PC-compatible programs that the 1000's keyboard does not seem to fit. Can I use another PC-type keyboard with the 1000? Can I use another PC-compatible mouse with the 1000 instead of Tandy's? (Mike Bean, Fayetteville, AR)

A: Most keyboards designed for the IBM PC do not work on the Tandy 1000. However, you can temporarily redefine the incompatible keys with the ANSI.SYS extended-screen and keyboard driver. The *Tandy 1000 Programmer's Reference Manual* (catalog no. 25-1503), appendix A, describes how to do it.

You can use a PC-compatible mouse driven by the serial port.

Superscript System Files

Q: I own a Model III and a Model 4. A few months ago, you listed the functions of all the Model 4 system files (January 1987, p. 70). I found the list very helpful. Please do the same for the Model III Superscript files. (Don Johnson, Carson City, NV)

A: Model III Superscript 1.3.x, is almost a reflection of the current Model 4 version. The disk files that Tandy supplies fall into four groups. The first group is the Superscript program and its overlays. The second group holds the printer drivers, such as DW2/CTL, DMPxx/CTL, and S/CTL. The third group comprises document files without extensions, such as Demo100, Catalog,

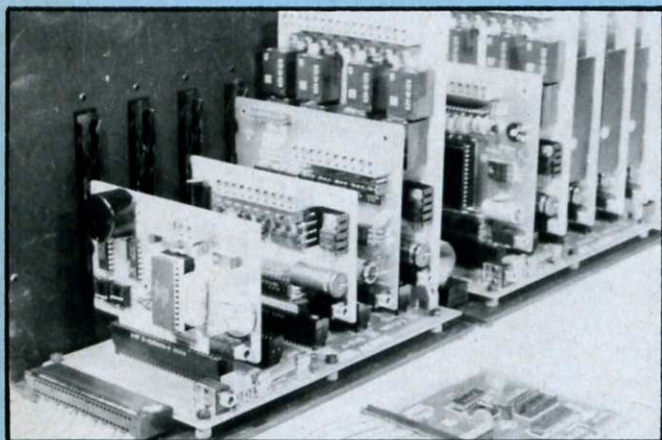
Program Listing. Model I routine to set paragraph indentation for Scripsit running under TRSDOS.

```
10 'Model I Default Indent fix
20 FL$;eq"SCRIPSIT/LC" 'change to SCRIPSIT/UC if needed
30 OPEN "R",1,FL$:FIELD 1,1 AS 177, 1 AS T$
40 GET 1,1
50 LSET T$;eqCHR$(&H00)
60 PUT 1,1:CLOSE 1:END
```

End

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- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card

RE-140: \$129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card

RE-156: \$99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card

AD-142: \$129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter

AN-146: \$139

This analog to digital converter is accurate to .025%. Input range is -4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card

IN-141: \$59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O

DG-148: \$65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

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CL-144: \$89

Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

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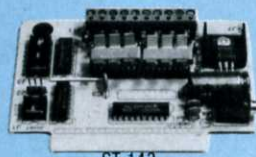
PH-145: \$79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

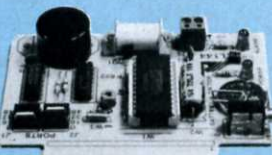
A-BUS Prototyping Card

PR-152: \$15

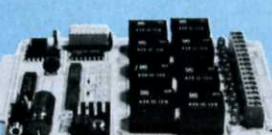
3 1/2 by 4 1/2 in. with power and ground bus. Fits up to 10 I.C.s



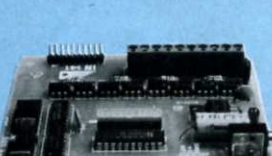
ST-143



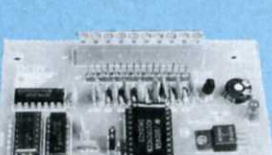
CL-144



RE-140



IN-141



AD-142

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Apple II, II+, IIe. Uses any slot.	AR-134...\$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...\$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...\$69
TRS-80 Mod 3, 4, 4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...\$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...\$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...\$39
Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.	AR-138...\$49

A-BUS Cable (3 ft, 50 cond.)

CA-163: \$24

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and Lectures. The fourth group holds system support programs, such as the Install/BLD and Harddisk/JCL files, which configure the optional Superscript Dictionary disk and set up the system for operation on a hard disk.

The program core is Scripsit/CMD and its overlays. These fall into three groups: word processing, spelling checking, and word-processing system configuration. They are as follows.

- **Scripsit/CMD:** Remains resident at all times but reloads after you use the spelling checker, which overwrites parts of it.
- **System/CTL:** Stores the default and user-defined configuration formats, such as tab lines, user-defined keys, and custom printer codes.
- **Help/CTL:** Provides the on-line help option for the control keys. You can remove it.
- **Errors/CTL:** Displays Scripsit errors. This is a text file. The system won't crash without it, but errors will appear as incomprehensible garbage on the status line.
- **Proof/CTL:** A major portion of the spelling checker. You can remove it if you do not use the Scripsit Dictionary.
- **Words/CTL:** Stores user-defined words. Remove it if you remove Proof/CTL.
- **SCR16/CTL:** Handles headers, footers, tab settings, and block controls.
- **SCR17/CTL:** Displays the main menu and executes the other modules that support Scripsit. It also contains the directory-read function.
- **SCR18/CTL:** Handles file-format structuring.
- **SCR19/CTL:** Like SCR18/CTL, but also handles queries and compares. This and SCR18/CTL are the system's workhorses.
- **SCR32/CTL:** Handles block action commands.
- **SCR33/CTL:** Handles the global-find, delete, and replace commands. Contains the search and replace portions of the proofreading program.
- **SCR34/CTL:** Controls the ASCII conversion and compression utilities. You can remove it.
- **SCR35/CTL:** Displays the system setup menu and handles the verify-deletion function and the text-mode user-key-storage option.
- **SCR36/CTL:** Controls the rest of the system-setup functions, such as user-defined-key editing, printer codes, alignment, and character setting.
- **SCR50/CTL:** Support program for the proofreader. You can remove it.

Requesting Backup

Q: I have a Model 4 with a hard disk. How can I back up the hard disk to floppies? (Darrell A. Sherrin, Kelowna, BC)

A: The Radio Shack Hard Disk Utilities has a back-up feature. Also, Powersoft (17060 Dallas Parkway, Suite 114, Dallas, TX 75248, 214-733-4475) has a back-up program (Backrest, \$99.95) that is more flexible and faster. If you just need to back up a few data files, use the TRSDOS Backup command.

More Superscript Tips

Q: I am using Superscript 1.00.01 with TRSDOS 6.01 on a Model 4 and have access to three printers: the DMP 420, 120, and 105.

My first question concerns using the block-action print command in a multi-page document. Due to poor typing and screen proofreading, I frequently find an error in a document after I have printed it, and, invariably, the error is on page 2, 3, and so on. I correct the error, block the page, press B for block-action, P for print, and enter when the print options appear, and the page is printed. The problem is that the printer feeds blank pages until it gets to the blocked page—a waste of paper. Is there a way to prevent this?

My second question concerns using the underline command with the superscript and subscript commands. I teach algebra and prepare my tests with Superscript. If I don't stop the underline before issuing the superscript command, the underline appears under the exponent. If I stop the underline before the superscript command and begin it again after subscript, I get a blank space in the underline. How can I continue the underline without the break? (Dick Breakiron, Myrtle Beach, SC)

A: Superscript 1.01.00 is an upgrade of 1.00.01 that fixes the page-feed problem. You should have been notified of a free upgrade by Tandy if you sent in the Superscript registration card. If they missed you, consult your local Radio Shack computer dealer.

The fastest solution to your second problem is to set up a special printer code. From the initial Superscript menu, select S (system-setup utility) and from that menu select C to enter printer codes.

Assume you want to use the numeral 9 as the special indicator. Use the down-arrow key to align yourself with the first space of the units column after "9," type zero, and press the down arrow once to get to the sequence column. Type 27,28,8,95,27,30. Press the down arrow again, type BACKLINE, press the enter key twice, then press the break key. You are now back at the main menu.

Whenever you type a document, after each superscripted character under which you want to print the line, press the clear key (producing a copyright symbol) followed by the 9 key.

The 27,28 sequence performs a half-line feed, 8,95 backs up the printer head and types an underscore character, and 27,30 performs a reverse half-line feed, returning you to your previous position. Check the printer manual for the proper codes.

Readers Respond

Thomas R.W. Longstaff (Waterville, ME) offers a fix for the extra line feeds that printers configured for use with older Tandy computers insert when used with PCs and newer Tandy machines. As Mr. Longstaff explains, the line feeds occur because Tandy computers and software expected printers to supply a line feed with each carriage return. His fix is for the Radio Shack Line Printer VI.

"To disable the unwanted extra line feed, I use the following technique:

- **Unplug the printer and remove the knob at the right end of the platen** (do this by removing the small screw in the center of the knob and gently sliding the knob off).
- **Remove the tractor feed, paper bail, cover, and the gray case that encloses the mechanism** (do this by removing seven screws, two at each side, two at the back and one inside the printer cabinet at the front center, and lifting off the case).
- **Find the small block with four DIP switches at the back of the mechanism** where the printer cable connects. The second switch controls line feeds. When the switch is open, the printer generates a line feed with each carriage return. Close the switch to disable the line feed.
- **Reassemble the printer.** You must reactivate the line feed to use the printer for graphics."

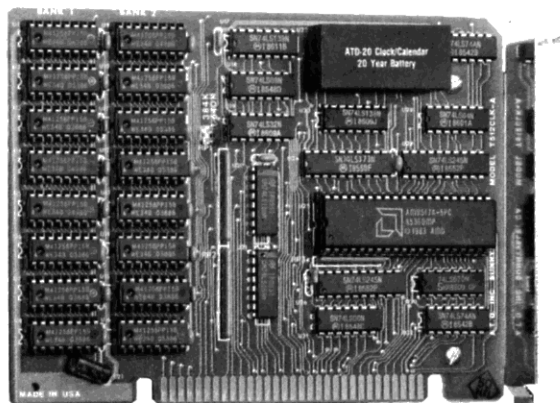
Seeking Help

- ▶ **Michael D. Scheehle** (19 Oak Meadow Court, Charlotte, NC 28210) is looking for the PFS:File program for the Model III. Radio Shack is unable to supply it and Software Publishing Corp. no longer supports the PFS series for the Model III.
- ▶ **Wilson Fletcher** (4117 Bird Drive, Erie, PA 16510) is looking for a Model 4P Modem Board (catalog no. 26-1084). Radio Shack has discontinued it.
- ▶ **Julius Gianakos** (P.O. Box 993, Peoria, IL 61601) is looking for instructions on how to add his Shugart 801 drives (8 inch) to his Model I with a double-density controller, LDOS 5.1, and 5 1/4-inch drives.
- ▶ **S. Goldhor** (1014 B St., Hayward, CA 94541) is looking for a schematic of the Holmes disk-controller board for the Model III. He needs information on setting the board's DIP switches. ■

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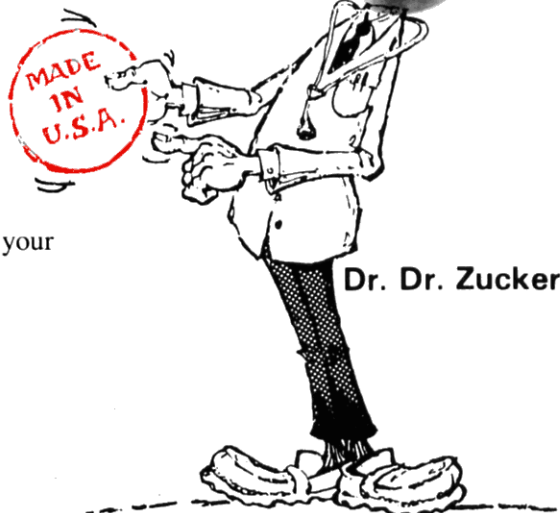
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	DMP 430	(26-1277)	498.00
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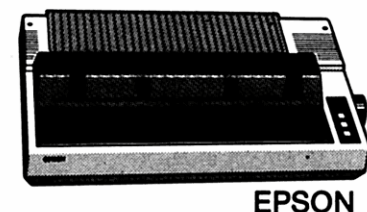
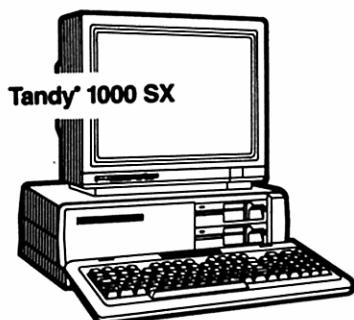
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TRSDOS's Bittersweet Reality

Tandyland

Poke a dedicated Model I, III, or 4 owner and you'll find a self-reliant individualist who is not given to following fads. When the fad turns into a monolithic standard, however—and who nowadays doesn't know that means IBM compatibles and MS-DOS—you wonder how long even the most stubborn devotee can hold out. Do Tandy's 8-bit machines have any future?

I asked a handful of people closely involved with the TRS-80 hardware and software business for their impressions of the patient's health. The consensus seems to be that the TRS-80 line looks remarkably well for an old coot who can only do a few things as well as his youthful counterparts, but the retirement home can't be far away.

Missing from most debates about TRSDOS's fate is an appreciation of its continued usefulness to thousands of satisfied customers. Bill Schroeder, president of Colorado-based Logical Systems Inc., the original developer of TRSDOS 6.x, said businesspeople and the media are so eager to jump on the latest bandwagon that they tend to dismiss older technology long before the public is ready to give up on it. "We are guilty of trying to prod them into a new computer when they don't need one," Schroeder said, later adding, "The users have a lot less gloomy picture of their situation than we try to paint for them."

It's hard to know how many people actively use TRS-80s. Recent figures from International Data Corp., a market-research firm, estimate the installed base of the Model 4, 4P, and 4D alone to be 325,000 worldwide. Tandy still sells somewhere between 500 and 4,000 Model 4Ds a month.



Even when it was introduced in 1983, the Model 4 was seen as a last gasp for the TRS-80 line.

The handful of remaining software firms continue to sell enough TRSDOS software to avoid having to drop it for a total commitment to MS-DOS. Roy Soltoff, president of Misosys Inc. in Sterling, VA, said he sold 600 units of TRSDOS 6-compatible LDOS 5.3 between Jan. 5 and mid-February, and he expects to sell 5,000 by the middle of next year. In February, Soltoff released eight utility programs, some of them repackaged products acquired from Logical Systems in a marketing deal. Sales of Schroeder's LS-DOS 6.3, which Tandy supports through letters to registered Model 4 owners, could reach 100,000 units by fall 1988, and Schroeder might release upgrades of existing utilities if the demand warrants.

User's groups and Compuserve's TRS-80 special-interest group (SIG) remain active.

According to Wayne Day, a sysop (system operator) for the SIG, "In general, I'd say that there's a very active and dedicated core of folks that are still using the TRSDOS machines, but some of them seem to be leaning towards the MS-DOS world."

In addition, TRS-80 users continue to represent the largest proportion of 80 Mi-

cro readers. In a reader survey last year, the Models I, III, and 4 filled three of the top four positions in a ranking of computer ownership. The users are out there, but they are getting increasingly worried whether any company—including Tandy—will support them.

For their part, Tandy officials insist they plan to provide service to TRS-80 owners indefinitely. Spokesperson Fran McGehee said Tandy will keep the Model 4D "in the line" but has no plans to introduce any new hardware or software. She emphatically denied rumors that the company has plans to introduce a Model 4 upgrade.

The \$1,199 price tag on the Model 4D has some people wondering about Tandy's commitment to this machine in a time when many IBM compatibles are selling for hundreds of dollars less. (Tandy's own successful clone, the 1000 SX, is priced at \$999 without a monitor.)

"How are they going to sell it?" Soltoff asked, adding that the remaining Model 4 business may consist mostly of residual sales to schools and businesses that already own several of the machines. Schroeder said, "The Model 4D should be \$699-\$799. You practically have to hog-tie the salesmen to get them to sell you one."

In a rare interview last July, Tandy Chairman John Roach shared his thoughts on the TRS-80 line with Jan Lewis in the *Computer Insider* newsletter. When Lewis asked why Roach referred to TRS-80 in the past tense, he replied, "Well, we continue to sell those kinds of machines, but there will be a minimum of new products offered in those lines. Our primary thrust is in the PC-compatible, MS-DOS world."

Where does that leave users? With perfectly utilitarian machines they can probably have fixed at Radio Shack, and for which practically no new software will be written in 1987 and beyond.

Schroeder has a formula he uses to gauge the health of the TRS-80 market, which today essentially involves only the Model 4. With a minimum of 250,000 computers in active use, a secondary market tends to support itself through magazines, mail-order retailing, and advertising. If a few more of those 250,000 end up in closets, however, the "critical mass" is lost and the secondary market dies.

Schroeder said he fears the Model 4 may slide past the point of no return this year, but he still wants to focus on its good points. "You can buy a used one dirt cheap, there is good existing software that is cheaper than IBM software, and it contains good, refined hardware. There are many strong points."

Dennis Brent, president of Dallas-based Powersoft, agreed with Schroeder's grim prediction for 1987, saying this is probably the last year for TRS-80 software developers to introduce new products. But, he said, "We're not jumping into MS-DOS with both feet. . . The Model III/4 is an excellent computer. . . We're still going to be here, and we will support you."

In a cost-cutting move, Tandy began converting 106 of its 490 Radio Shack Computer Centers (RSCCs) to Plus Computer Centers starting Feb. 1. The new Plus Centers will still carry the full line of Tandy computers but will not have training or repair service. Tandy will transfer "outbound" salespeople working with business accounts to nearby RSCCs.

Ed Juge, Tandy's director of market planning, said the need for business-oriented stores has diminished with the growth of the outbound sales force, now estimated at 1,900 nationally. "We expect the net result of these changes to be improved coverage for walk-in customers," Juge said. "Customers served by the outbound sales organization should notice no difference. Conversion should also result in cost savings to Radio Shack."

Tandy closed down 24 stores completely and established Plus Centers in nearby Radio Shack retail stores but had no plans to lay off employees, according to another spokesperson.

If sheer quantity is what impresses you, consider that in 1986 Tandy spent an estimated \$8.7 million on print advertising alone, compared with \$4 million the previous year. Now consider that Tandy's budget is dwarfed by others in

a list of 8,950 high-tech advertisers topped by AT&T, which spent \$60 million on 3,556 pages of advertising in 92 publications last year. And I haven't mentioned television and radio.

The latest semi-annual HiTAP (High Tech Ad Placement) report from C Systems Ltd. of Ridgefield, CT, shows that Tandy placed more ad pages in *80 Micro* than in any other publication. One hundred forty-two Tandy pages costing an estimated \$592,000 appeared here; in second place was *Rainbow*, with 42 pages worth \$88,000. Page counts don't tell the whole story, however. In dollars, a page in *80 Micro* is to a page in *Business Week* what a used, low-mileage Honda is to a shiny, new BMW. *Business Week* was thus the chief beneficiary of Tandy's promotional urges, carrying 30 pages worth an estimated \$1.18 million. The *Wall Street Journal* followed, with 29 pages at \$986,600.

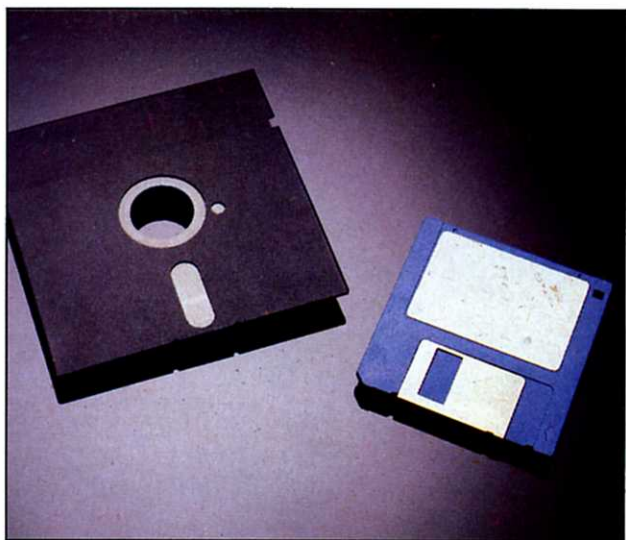
The total number of pages taken out by the companies included in the HiTAP report was down about 9,000 from the previous year's total of 160,000. Expenditures, however, rose about 6.6 percent to \$1.28 billion.

Tandy's 595 pages in 48 publications may seem piddling next to those of AT&T or second-place IBM, which ran 2,173 pages worth \$44 million in more than 70 periodicals. Xerox, Hewlett-Packard, and Compaq all spent more than Tandy. But \$8.7 million is more than many companies take in all year, giving us an idea of just how big the big players are. (Tandy said that its advertising expenditures for fiscal 1986, including print, television, radio, and catalogs, totaled \$221.2 million.)

Update

A May 1984 Pulse Train report rhetorically asked whether 3½-inch floppy disks would someday replace 5¼-inch disks as the standard storage medium for microcomputers. Now, after three years of technology's inexorable march comes the answer: probably.

Disk/Trend Inc., a Los Angeles based



According to predictions, microflopplies will become standard replacing the 5¼-inch disks by 1989.

market-research firm, predicts so-called microflopplies will become standard by 1989. Quoted in *Infoworld*, Disk/Trend Vice President Robert Katzive said IBM will lead the trend this year by putting smaller drives in its long-awaited "clone-buster" PCs. Meanwhile, disk and drive developers will introduce products offering several megabytes (MB) of storage—on disks of both sizes—for use with higher-powered machines.

Projected 1986 sales of 3½-inch drives were up 71 percent over the 3.3 million units sold the year before. The number could rise to 14 million units by 1989, according to Disk/Trend. Already, microflopplies account for 26 percent of the floppy-disk market. What are the benefits?

For one, smaller drives are helpful in producing "small-footprint" PCs designed to economize on desk space. Metal sleeves protect the disks themselves, reducing the likelihood of data loss. And there are substantial gains in storage capacity.

Toshiba America Inc. of Tustin, CA, has begun showing a prototype of a 4MB microfloppy drive to original-equipment manufacturers (OEMs), according to *Infoworld*. The drive could go into production in 1988. Mountain View, CA, based Kao Corp. of America is testing microflopplies that hold up to 7MB.

The technology for 5¼-inch disks isn't standing still either. Kao Corp. and several other companies are working on floppies with capacities as high as 50MB, and Konica Technologies Inc. of Sunnyvale, CA, has released a floppy-disk drive that could appeal to current users of low-capacity hard disks.

"When" has now replaced "if" as the operant word. ■

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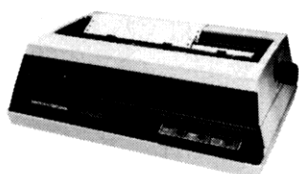
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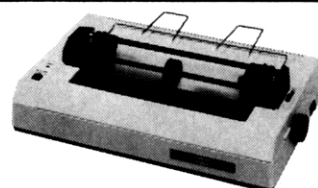
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Recovering "Lost" Memdisk Files

If you accidentally press reset and wipe out your Memdisk, you haven't really lost the files there. Just repeat the Memdisk initialization:

```
SYSTEM (DRIVE=n,DRIVER=
"MEMDISK")
```

Do not, however, format the Memdisk. A directory of the Memdisk drive should show that all your files are still there.

Mark Hershberger
El Dorado, AR

Using Shell18/CMD with LS-DOS 6.3

The public-domain, Model 4 DOS shell program, Shell18/CMD, doesn't work with LS-DOS 6.3. Attempts to execute it result in the message, "TRSDOS 6.2 is required for this program."

A simple POKE 133,98 from Basic cures the problem. This Poke might work with other programs incompatible with LS-DOS 6.3.

Bob Littlepage
Hattiesburg, MS



Newdos to MS-DOS Via Supercross

Powersoft's Supercross/XT III utility will not convert Model III Newdos/80 MU-type sequential files to MS-DOS format. According to Powersoft, Supercross/XT III only supports files created by TRSDOS 1.3's Open "I" statement and containing ASCII characters with each line ending in a carriage return. It moves that data to an MS-DOS disk and adds a line feed after the carriage return.

I did get around the problem, however. I changed one of my Newdos/80 file-maintenance programs so that it read the files into memory using its normal Disk Basic input/output (I/O) instructions and then wrote it back to disk using TRSDOS's Disk Basic sequential I/O instructions.

First, I replaced:
OPEN "O",1,"filespec","MU"

with:

```
OPEN "O",1,"filespec"
```

Then I replaced:

```
PUT 1,...A(I),A$(I),B$(I),C$(I),D$;
```

with:
PRINT#1,A(I),K\$,A\$(I),K\$,B\$(I),K\$,C\$(I),K\$,D\$(I)

You must also include the statement K\$=";" to serve as delimiters.

After I converted and transferred the original Newdos/80 programs that created and maintained the sequential files, I replaced the Put and Print# statements with Write# statements to automatically insert the delimiters.

Mark Morris
Pueblo, CO

Update: Loose-Leaf Listings

I've made some enhancements to Kenneth Frith's program (Reader Forum, February 1987, p. 25) that prints out listings for placement in loose-leaf binders. My version (Program Listing 1) pages past perforations, stops for single-sheet use, and lets you use different printers and operating systems.

Line 130 lets you indent the left margin to allow

enough space for you to punch holes. Line 140 prompts for the type of paper you are using. If you use single sheets, the printer stops and waits for you to change the paper.

Line 150 sets the variable values for the indent and the number of dashes in the header and footer. It also places the date at the right of the header line.

By changing the date format in line 180, the program will work with any Model III or 4 operating system. For the Model III use:

```
LEFT$(TIME$,8)
```

For the Model 4 use:

```
DATE$
```

Line 180 also puts the date on page 1 only. Line 350 halts the printer when using single

sheets. Line 410 skips perforations when using tractor-feed paper and advances to the top of form when finished printing.

Important variables are F, the number of dashes for the header and footer; P, the date placement; and ID, the number of spaces to indent the left margin.

M.H. Briggs
Walla Walla, WA

Program Listing 1. Utility to print out Basic listings for storage in loose-leaf binders. See p. 116 for information on using the checksums.

```
100 ' Model III/IV version Up-grade of Kenneth
    ' M. Frith Basic Program Lister,
    ' by M.H. Briggs
110 CLEAR 300:CLS:O=1:DEFINT I-L 'CLEAR only
    ' for Model III
120 PRINT " BASIC PROGRAM LISTER WITH HEADER AND
    ' FOOTER, PAGE NUMBERS":PRINT
130 PRINT " Enter Left Margin Indent (ENTER=0) "
    ' :PRINT:INPUT ID:P=80:PRINT
140 PRINT " Tractor Feed Pages, or Single Sheet
    ' Feed (T/S) (ENTER=T)":PRINT:INPUT H$:PRINT
150 P=F-ID:P=79 'Limits number of dashes for u
    ' nderline and date placement
160 PRINT " Enter Program Filename (ASCII only) "
    ' :PRINT:INPUT F$:
170 OPEN "I",1,F$:
180 IF O>1 THEN LPRINT TAB(ID)"Program: "F$ T
    ' AB(P-LEN(F$)) ELSE LPRINT TAB(ID)"Program
    ' : "F$ TAB(P-LEN(F$)) LEFT$(TIME$,8)
190 LPRINT TAB(ID) STRING$(F,""):LPRINT
210 IF I$="" THEN LINE INPUT #1,I$
220 IF LEN(I$)<=P THEN J=LEN(I$) ELSE J=F
230 K=0:O=2 'O allows date printing on page
    ' one only
240 FOR I=1 TO J
250 IF ASC(MID$(I$,I,1))=10 THEN J=I:K=1:GOTO
    ' 270:NEXT
270 J$=LEFT$(I$,J-K):I$=RIGHT$(I$,LEN(I$)-J):L
    ' =L+1
300 LPRINT TAB(ID)J$
320 IF EOF(1) THEN FOR I=L+1 TO 50:LPRINT:NEXT
    ' :GOTO 340
330 IF L<50 THEN 210
340 LPRINT:LPRINT '2 lines before page number
350 LPRINT TAB(ID) STRING$(F,""):PG=PG+1
370 LPRINT TAB(ID) TAB(36) "PAGE - " USING "##
    ' ",PG:LPRINT CHR$(12)
390 IF H$="" OR H$="T" THEN 410 ELSE PRINT "Pr
    ' ess ENTER when ready "
400 I$=INKEY$:IF I$="" THEN 400
410 FOR X=0 TO 7:LPRINT:NEXT 'Skip perforation
420 L=0:IF NOT EOF(1) THEN 180
440 PRINT "Press <ENTER> to run another listin
    ' g, <BREAK> to quit."
450 INPUT Q$:IF Q$="" THEN RUN
```

End

Program Listing 2. Hash-code-generating routine for the Models I/III/4 (in III mode).

```

00100 ;HASH CODE GENERATOR FOR FILE NAMES-HASH/CMD & HASH
00120 ;FOR MOD I, MOD III, AND MOD 4 (IN MOD III MODE)
00140 ORG 7000H
00150 DI
00160 CALL CLS
00170 START LD HL,MSG1 ;INP 11 BYTE FILE NAME
00180 CALL DPLY
00190 CALL SKIP
00200 CALL INPUT
00210 LD HL,BUFFER ;FILE NAME & EXTENSION
00220 LD B,11 ;11 BYTES TO HASH
00230 XOR A ;ZERO OUT 'A'
00240 HASH (HL) ;MODULO 2 ADDITION
00250 INC HL ;NEXT BYTE TO HASH
00260 RLCA ;ROTATE A LEFT THRU CARRY
00270 DJNZ HASH ;JP HASH TILL 'B' = ZERO
00280 OR A ;CHECK FOR ZERO HASH CODE
00290 JR NZ,HASH1 ;NOT ZERO GOTO HASH1
00300 INC A ;IF ZERO, CORRECT IT
00310 HASH1 LD (HASH2),A ;STASH HASH IN BINARY
00320 CALL HEX8 ;CONVERT HASH TO HEX
00330 CALL SKIP
00340 LD HL,MSG2 ;AND DISPLAY HEX VALUE
00350 CALL DPLY
00360 CALL 049H
00370 CP 1 ;BREAK KEY PRESSED? IF SO
00380 JP Z,402DH ;GOTO MODEL III DOS READY
00390 CALL SKIP
00400 JP START
00410 MSG1 DEFB 'Input 11 byte filename/extension. Use '
00420 DEFB 'spaces to fill if needed. Do not input '
00430 DEFB 'the (/) symbol if used.'
00440 DEFB 0
00450 MSG2 DEFB 'The hash code is '
00460 HEX DEFB 0
00470 DEFB ' Hexadecimal.'
00480 DEFB 0
00490 DPLY LD A,(HL)
00500 CP 0 ;END MESSAGE DELIMITER
00510 RET Z
00520 CALL 033H ;DISPLAY BYTE ON VIDEO
00530 INC HL
00540 JP DPLY
00550 HASH2 DEFB 0
00560 INPUT LD A,11 ;11 BYTES TO HASH
00570 LD (COUNT),A
00580 LD HL,BUFFER
00590 IN1 CALL 049H ;AWAIT KEYBOARD INPUT
00600 CP 32
00610 JP M,INPUT
00620 CP 91
00630 JP P,INPUT
00640 LD (HL),A
00650 INC HL
00660 CALL 033H ;DISPLAY BYTE ON VIDEO
00670 LD A,(COUNT)
00680 DEC A
00690 RET Z ;11 BYTES IN = ALL DONE
00700 LD (COUNT),A
00710 JP IN1
00720 SKIP LD A,13 ;TWO VIDEO CARRIAGE RET
00730 CALL 033H
00740 LD A,13
00750 CALL 033H
00760 RET
00770 COUNT DEFB 0 ;BYTE COUNTER
00780 CLS LD HL,15360 ;BEGIN VIDEO MEM
00790 LD (16416),HL ;MOD I & III CURSOR
00800 LD DE,15361
00810 LD BC,1023
00820 LD (HL),32 ;FILL VIDEO SPACES
00830 LDIR
00840 RET
00850 HEX8 PUSH AF ;CONVERT BINARY TO HEX
00860 LD HL,HEX ;CONVERTED HEX STASH
00870 RRA
00880 RRA
00890 RRA
00900 RRA
00910 CALL BINHEX ;GENERATE FIRST BYTE
00920 POP AF ;GENERATE SECOND BYTE
00930 BINHEX AND 0FH ;AND IMMEDIATE WITH 'A'
00940 ADD A,90H ;ADD TO 'A'
00950 DAA ;CONVERT 'A' TO BCD
00960 ADC A,40H ;ADD IMMEDIATE W/CARRY 'A'
00970 DAA
00980 LD (HL),A ;STASH HEX VALUE
00990 INC HL
01000 RET
01010 BUFFER DEFS 11 ;FILENAME/EXT STASH
01020 DEFB 0
01030 END 7000H

```

End

Slinging Hash

Program Listing 2 is a short assembly-language routine that generates any Model I/III/4 filespec's hash code. It runs on the I, III, and 4 in the III mode, and the hash codes are valid for TRSDOS 2.3, 1.3, and 6.2.

The file names can be up to eight characters long with up to three-character extensions. Do not enter the slash (/) symbol.

To get the hash code for a file, Test/BAS, execute the routine and enter TEST (four spaces) BAS for a total of 11 characters. You must always enter 11 characters with the extension as the last characters. If you use no extension, enter spaces to fill the 11 bytes.

Dick Robertson
Chautauqua, NY



The Old Character Switcheroo

The following code switches between the Model 4's space-compression and special characters from Basic:

```

10 CLS:PRINT CHR$(200);:IF
   POS(X)>5 THEN PRINT
   CHR$(21);

```

This line turns on the special characters. Changing the greater-than (>) sign to a less-than (<) sign turns on the space-compression characters.

If clearing the screen is inconvenient at the point where you wish to make the switch, change the CLS to:

```
PRINT@(L,0).CHR$(200);
```

where L is any convenient line on the screen. The semicolon (;) after CHR\$(200) is necessary; otherwise the computer sends a line feed, and POS(X) will always be zero.

Patrick P. Brown
San Francisco, CA

Update: Vitamin E Poke for 4 in III

I've found a way to incorporate Wayne Culbreth's speed-up Poke for the Model 4 in III mode (Reader Forum, February 1987, p. 25) in a Do file:

```

BUILD SPEED/BLD
BASIC

```

```

.Press enter three times.
POKE 16912,200

```

```

.Press enter three times.
CMD"S"
SCRIPSIT

```

.Press enter once and then break to exit.

The additional enter key-strokes are sometimes necessary to give the computer some "breathing" room.

Setting up my example as an autoloader file (AUTO DO SPEED/BLD), allows your Model 4 to automatically boot in the program specified. Scritpsit in this case. By omitting the program name, the computer returns to DOS in the faster mode.

Robert N.L. Forman
Monmouth, IL

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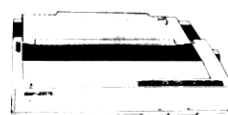
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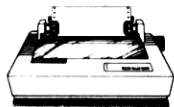


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Tandy 1000 EX

by John D. Wolfskill

★★★★

The Tandy 1000 EX comes with 256K RAM, one disk drive, and three expansion slots. Tandy Corporation, Fort Worth, TX 76102. Catalog no. 25-1050, \$599.

The 1000 EX is one of Tandy's new line of hybrid computers designed to appeal to a wide range of users. Categorizing the EX is not easy. Its built-in keyboard and side-facing disk drive give it the appearance of a home computer. Tipping the scales at a mere 11 pounds and being small enough to tuck under your arm make it highly transportable.

Toss in a dual-speed 8088 CPU capable of running most PC software and the EX becomes a somewhat PC-compatible machine. Add features like a multivoice sound chip, headset connector, 16-color graphics, and network expansion adapter, and the computer seems a natural for the school and educational market.

Standard features include a slim-line, 5¼-inch, 360K internal floppy-disk drive; 256K RAM (expandable to 640K); a parallel printer port; dual joystick ports; and a 90-key, full-stroke keyboard with numeric keypad. The EX can drive RGBI, color, or monochrome composite monitors or a standard color-television receiver via an optional radio-frequency modulator. Other features include an internal speaker with adjustable volume control and an ⅛-inch headset connector. A rear-mounted, IBM plug-compatible expansion port attaches an optional 360K, 5¼-inch or 720K, 3½-inch external disk drive.

The EX can accommodate up to three Tandy Plus expansion modules for adding memory (catalog no. 25-1062, \$129.95), an RS-232C serial port (catalog no. 25-1014, \$79.95), a 1,200-baud modem (catalog no. 25-1018, \$199.95), a mouse/clock/calendar (catalog no. 25-1015, \$99.95), or a network adapter (catalog no. 25-1019, \$299.95).

You must install the Plus memory



module before other expansion modules. It provides a direct-memory-access (DMA) controller, boosts memory to 384K, and provides empty sockets for an additional 256K of RAM.

Bundled software includes MS-DOS 2.11.24, GW-Basic 2.02, and Personal Deskmate, an extensive desktop application manager similar in design to Microsoft's Windows operating environment.

Setup

The start-up and installation documentation is well written and easy to understand. MS-DOS and Basic coverage is adequate, but you must purchase additional manuals for other than casual use. Setting up the 1000 EX is simple. Separate manuals and reference guides move you quickly through equipment setup to installation of the Deskmate software. Adding the Plus memory-expansion

module takes only a few minutes due to the handy top-mounted, slide-off, expansion-slot cover.

An optional stand (catalog no. 26-210, \$29.95) holds a monitor and optional second disk drive above the keyboard. The 1000 EX works with all Tandy RGBI color monitors, except the high-resolution CM-1. Text quality and color reproduction are excellent with the CM-10, good with the CM-5, and only fair with the machine plugged into a composite color monitor or color TV.

Spacewise, the unit's small footprint is deceptive.

The sideways-mounted internal disk drive requires 9 to 12 inches of free desk space to the keyboard's immediate right to comfortably insert and remove disks.

In addition, the drive-activity light isn't visible from the normal operating position, making a reassuring glance for proper drive operation difficult. The unsettling honk of the Teac 55B disk drive provides the only indication that a disk access is in progress. However, the ultra-quiet cooling fan helps balance the overall noise level.

Under the Hood

The computer is heavily shielded for radio-frequency interference (rfi) and produces negligible television interference when operating directly atop and sharing the same line outlet as a television receiver. This effort to reduce stray radiation is a noteworthy improvement over earlier versions of the Tandy 1000. Inside, you'll find a 48-watt power supply adequate to power the expected load of the computer and its three expansion slots.

Keyboard feel and response is good. All keys provide adequate resistance and solid tactile feedback. The keyboard is identical to the original 1000, except for the relocation of the caps—and number-lock indicator lights and the addition of a power-on light in a cluster above the numeric keypad. Unfortunately, the EX

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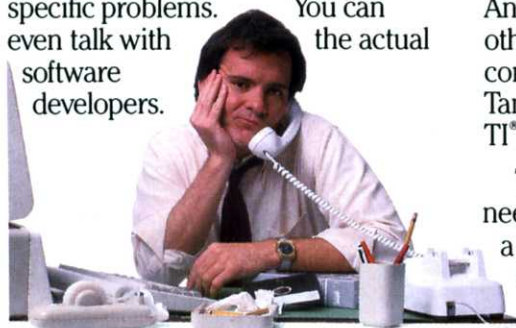
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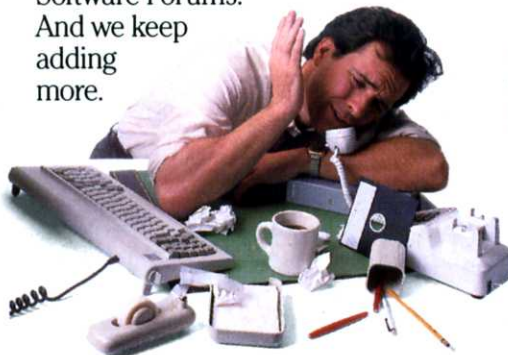
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suffers the same keypad mapping problems that make all Tandy 1000s inconvenient to use with many software packages written for the IBM PC.

Performance

The EX's dual-speed Intel 8088-2 CPU normally runs at high speed (7.16 megahertz [MHz]). However, you can press the F4 function key just before loading DOS to toggle the clock to slow speed (4.77 MHz). You cannot change the clock speed from within an application without returning to DOS or the Deskmate shell.

The EX scored a consistent 1.4 on the Norton Utilities system-information test while running at high clock speed, indicating that the machine operates approximately 40 percent faster than the original IBM PC.

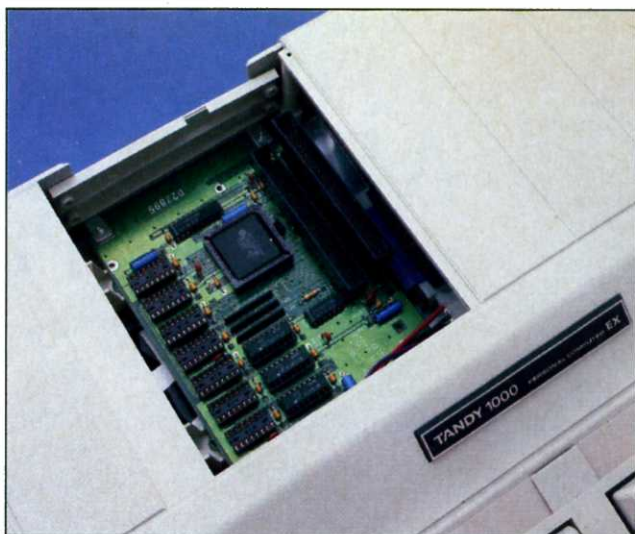
The 8088-2 and Phoenix Software Associates ROM basic input/output system (BIOS) chip successfully navigated every application I tested, including Lotus's 1-2-3, Multiplan, PFS:File, Quickbasic 2.0, and graphics-oriented applications such as Flight Simulator, Jet, and Prodesign II CAD.

However, the EX won't run color software designed for the IBM Enhanced

Graphics Adapter (EGA). An EGA-compatible expansion board to fit the 1000 EX proprietary expansion bus is not currently available. The EX accepts only Tandy Plus (and third-party) expansion modules.

Personal Deskmate

Personal Deskmate comes as part of the bundled software package. The massive two-disk package provides productive start-up software covering a variety of home and personal applications. It acts as a memory-resident manager for controlling the Deskmate modules. It also doubles as a DOS file manager and provides a way to run almost any program directly from the Deskmate core.



Inside the Tandy 1000 EX.

The package consists of six program modules. Text is a graphics-driven text processor. Worksheet is a 99-row by 99-column spreadsheet. Filer is an all-purpose information storage and retrieval system. Paint adds an excellent graphics painting program, while Calendar lets you keep track of schedules and appoint-

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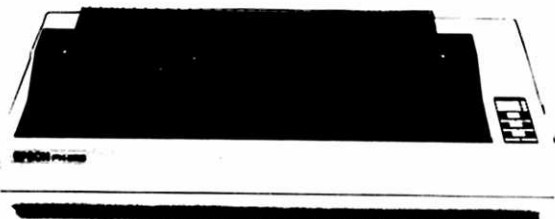
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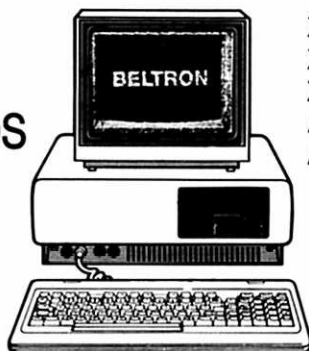
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ments. Telecom provides a full-function telecommunications program when the optional Plus serial or modem modules are installed.

A mouse-oriented, point-and-click application manager called the Tandy Desktop manages the Deskmate modules. Its features include a calculator, five-page notepad, phone list, and DOS file manager. You can define any application program (and its accompanying data files) as a module. You can create, display, resize, delete, and shuffle a module around the Desktop screen, then run it as a stand-alone application with return to memory-resident Desktop.

Navigating through Personal Deskmate is a snap using the keyboard, a joystick, or a mouse. The documentation recommends using the Tandy Digi-Mouse (catalog no. 26-1197, \$99.95) and Plus clock/

mouse expansion board. If you don't need a clock/calendar, you can get the same results by installing the joystick device driver and using the Tandy Color Mouse (catalog no. 26-3025, \$49.95).

The Desktop accessory option lets you redefine screen colors and communications parameters, customize printer setups for most any printer, and much more. Although you'll rarely need them, excellent context-sensitive help screens are a keystroke or double mouse click away.

The only problem with Personal Deskmate is its behemoth size. You need at least 384K RAM to load the entire package into memory without dispersing the modules onto individual disks. In this configuration, you must load modules from separate disks to make them available to the Desktop core. Single-drive users will find frequent disk accesses and disk swaps the order of the day.

Summary

At \$599, the 1000 EX is an exceptional value. It bespeaks quality in materials and workmanship. The low base price, solid documentation, and ability to run IBM PC software make it an excellent computer for home or school. Fol-



The application manager lets you work with Deskmate's modules.

lowing earlier mediocre attempts at providing productive bundled software (Deskmate I and II), Tandy has done it right this time. Personal Deskmate is unquestionably the best application manager currently available for a personal computer.

However, the EX is not a "something for everyone" computer. If your plans include expanding the EX into a high-powered, PC-compatible machine later on, you'll find its lack of internal expansion and its proprietary system bus a roadblock. ■

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by David A. Williams

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ASP runs on the Tandy 1000/1200/3000. Aspen Systems, P.O. Box 1163, Grand Junction, CO 81502, 303-245-3262. \$130.

★★★

ASE runs on the Tandy 1000/1200/3000. Aspen Systems. \$99.

Program development is easier when you have ready-made subroutines on hand to insert where needed. If your subroutine collection is lacking, Aspen Systems has two offerings that you might consider. ASP is a group of 139 subroutines in a single library file. Its functions include simple arithmetic, sorting, display, and disk input/output (I/O). ASE is a subroutine editor that helps you design custom data-input screens with windows and verification of user input.

You can use both packages with Microsoft Basic, Fortran, Cobol, and Pascal compilers; with the IBM Basic interpreter; or in assembly-language programs. Aspen Systems does not require royalties if you display an acknowledgment on the final program.

I evaluated both products on a Tandy 1200 HD with Microsoft's Basic compiler, Bascom, and Macro Assembler.

ASP

The ASP subroutines were originally written for CP/M. Aspen Systems has updated and expanded the CP/M version, but modern MS-DOS-based compilers need less assistance than their CP/M predecessors. Still, the package provides some functions you might find useful. The subroutines enhance Fortran's string-manipulation capability and provide large-number, decimal arithmetic for Basic. If you use assembly, which has few built-in functions, ASP could be a great time-saver, but the documentation provides limited help for the assembly programmer.

The functions fall into the categories of data formatting and conversion, screen and keyboard I/O, disk I/O, arithmetic, and sorting. Some are trivial. One merely sends a carriage return to the display, and many of the disk I/O routines duplicate BIOS and DOS functions.

The 300-page manual is the weakest part of this package. It was reproduced from the output of a poor-quality dot-matrix printer, but the manual's poor legibility is exceeded by its lack of clarity. It contains interesting historical and tutorial information, but it is of little

practical help in the application of the subroutines. The installation and configuration instructions are especially confusing; information contained in a Read-me file supersedes many of the manual's instructions. The documentation has numerous errors and program sequences that don't work.

Fortunately, sample programs illustrate the application of some of the subroutines. ASP provides Fortran, Pascal, and Basic source code for these programs, all of which ran and performed.

Except for the arithmetic functions, ASP's performance is disappointing.

Between the sample programs and a great deal of experimentation, I did get several routines working in test programs. Except for the arithmetic functions, performance was disappointing. ASP routines did not improve Bascom's screen-display times, an area sorely in need of improvement. Even compiled Basic is much slower than those snappy assembly programs that write directly to the display buffer. The memory-sort routine showed a small performance improvement. A program to sort a 1,000-record, six-element array took 5.3 seconds using the ASP routine, but only 5.9 seconds with Bascom using a standard sort procedure. The EXE files for my test programs were about 15 percent larger when I used the ASP routines.

ASP should yield a substantial performance improvement when used with the Basic interpreter, but Quickbasic would be a better investment.

The arithmetic subroutines will be of interest if you program in Basic and write financial packages or programs requiring exact results when handling large numbers. ASP uses decimal arithmetic on strings of ASCII digits that can be up to 65,535 digits. It is impressive to multiply two 30-digit numbers and see the result appear instantly. The routines are limited to simple arithmetic functions; they don't include scientific functions.

ASE

ASE provides complete screen-management and data-input functions in two major subroutines. The package also includes several supporting routines for moving data around in memory, reading and writing files, data conversion, and

simple screen display.

Don't expect to write a word processor or even a reasonably capable text editor with this product. ASE's primary mission is to provide sophisticated data entry for forms-oriented applications. The programmer has complete control over display and record formats and can design the format to change in response to user input. The usual cursor movements are present, including block functions.

You can tightly control the length and content of user input. The input-validation scheme checks for length, range, and format, and you can display error messages to tell the operator what is wrong. ASE also provides select inputs, giving a choice of several options.

The ASE manual, a considerable improvement over ASP's, is clearer and more readable. Still, ASE is a complex program, and you can expect to spend a substantial amount of time reading the manual and studying the single programming example.

The demonstration program is a comprehensive example of an ASE application. It includes well-annotated source code in all the supported languages except assembly. The key assignments used in the demo seem a little odd (delete and backspace perform the same function), but you can change them to your liking.

ASE uses a Map file to control display formats. Each window requires a different file, and the program can dynamically change them. The Map file conveys no actual visual impression of what the display will look like. Prepared with a text editor, Map consists of a string of command mnemonics and parameters. The order of the commands determines the order in which the items will appear in the final display.

The available command parameters are many and complex. In fact, ASE is a mini-programming language that includes conditional statements and loops. You can use conditionals to change the format of the form as a function of user response. For example, the Option command, performing like the Basic On...Goto statement, branches to one of a number of command strings.

The Bottom Line

While I can't recommend these packages for the novice, they might interest the serious or professional programmer. Of the two, the editor is more useful. The problem with this type of package is that it has to be flexible enough to meet a wide variety of requirements. This leads to larger code and poorer performance than is possible with a custom design. I would find the products more useful if they included source code that I could modify to suit my application. ■

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US VS. THEM

FEATURES	CLONE	IBM PC/XT	TANDY 1000 EX (SX)	LEADING EDGE Model D
Microprocessor: Intel 8088 @ 4.77MHz	YES	YES	YES	YES
Power Supply Rating	8mHz Optional	NO	7.16mHz STD	NO
IBM Standard Bus:	150 WATT	63.5 WATT	54 WATT	130 WATT
Operating System:	YES	YES	NO	YES
Disk BASIC:	MS-DOS 3.2	EXTRA	MS-DOS 2.11 (3.2)	MS-DOS 3.1
MS-DOS and BASIC Ref. manuals:	YES	IN ROM	YES	YES
Standard System RAM:	YES	EXTRA	EXTRA	YES
Cost to Expand RAM:	640K	256K	256K (384K)	512K
Keyboard:	-0-	\$\$	\$259 (\$129)	\$
Video Monitor: (composite)	'AT' STYLE	STD	NON-STD	STD
Video Outputs:	INCLUDED	EXTRA	EXTRA	INCLUDED
Disk Drive Capacity:	BW/NTSC/RGB	EXTRA	NTSC, RGB	B/W, RGB
Max Number of Internal Drives:	1-360K	1-360K	1-360K (2-360K)	2-360K
Internal Expansion Slots:	4	4	1 (2)	2
Accepts Standard IBM Cards:	8	5	1 (5)	4
8087 Math Co-Processor Option:	YES	YES	NO (10" Only)	YES
Sturdy Steel Case:	YES	YES	NO (YES)	YES
Standard Parallel Ports:	YES	YES	PLASTIC	PLASTIC
Standard Joystick and Light Pen Ports:	1	0	1	1
Standard Serial Ports:	YES	NO	J (J/LP)	NO
Warranty	2 (1 Optional)	0	0	1
Clock/Calendar	1 YEAR	90 DAYS	90 DAYS	15 MONTHS
	YES	NO	NO	YES
Cost Ready-to-Run	\$699	\$3,063	\$1,398 + (\$1,683 +)	\$1,295
8mHz Option	\$799			

Add \$35 for ground delivery; \$70 for air.

IBM XT cost figures*: Video Display Adapter \$250; Video Display \$275; IBM XT computer \$2,145; Additional Ports, serial port, game port, parallel port, 640K RAM \$308; DOS 3.2 and BASIC \$85; Total \$3,063. Does not include the battery back-up clock calendar. No light pen port.

Tandy 1000 cost figures*: DOS 2.11 and BASIC reference manuals \$29 +; Memory Plus Expansion Board (to 384K) \$129 +; 256K Additional RAM \$129 +; One serial Port \$79 +; Battery Back-up Clock Calendar \$99 +; Composite Monochrome Monitor \$129 +; Model 1000 EX Computer \$799; Model 1000 SX Computer \$1199; We were not able to equip the Tandy 1000 to directly compare with the Clone because of the 1000's inherent design limitations.

*The above prices are list prices as best we could determine. Both the IBM and Tandy are available at a discount.

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REVIEWS

Smart, But Not Wise

by Mark D. Goodwin

★ ★

E1 runs on the Models I/III/4 (48/64K) and the Tandy 1000/1200/3000 (128K) and requires TRSDOS 6.2 and two disk drives. Pittman Associates, Suite 272, 7837 Greenback Lane, Citrus Heights, CA 95610, 916-966-7769. \$149.95.

E1 is an artificially intelligent database program; it makes relationships among data that you enter in the form of keywords and phrases, along with their definitions. The way in which E1 makes these relationships depends on the questions you ask it.

The system handles information through four operational modes: Learn, Request, Forget, and Dump.

The first step in using E1 is entering concepts and dictionary items in its Learn mode. Figure 1 presents the five grammatical structures E1 can use to learn new concepts. Figure 2 illustrates how these grammatical structures link concepts. Dictionary items are keywords or phrases that require lengthy definitions. You enter these items into the data base by telling E1 the specific keyword or phrase and then entering its explanatory text.

Once the E1 data base has absorbed data, you can access it by asking E1 questions in the Request mode. Some questions can generate a yes or no response. Therefore, E1 lets the operator request a reason for the resulting response. You prompt E1 for an explanation by asking "How?", "Why?", or "How Do You Know?", or simply by demanding that E1 prove it.

You can also access the E1 data base through the Dump mode. It generates a complete listing of the data base's concepts, keywords, and phrases. The Dump mode's listings can be particularly useful for learning whether the data base contains information relating to a specific piece of data.

As with all data bases, an E1 data base will eventually hold a great deal of unnecessary data. You can purge it from the data base through E1's Forget mode. The Forget mode lets you purge data by a statement, a specific keyword or phrase, or a concept. When you use a statement for purging, you use the Learn mode's grammatical structures. Whenever you purge a concept from the data base, E1 automatically deletes all references to it.

The E1 documentation is a poor, 39-page manual. While the manual presents an overview of the system, its lack of detail is confusing. For example, the manual doesn't give a step-by-step procedure for executing E1. Although execution is

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X is a Y	For equality
X has Y	For inclusion (X contains Y)
X is Y	Where Y is a quality of X
X can Y	Capability, capacity, facility of
X is like Y	Similarity, analogy, approximation

Fig. 1. Learn-mode grammatical structures.

ORANGE
is a
CITRUS FRUIT
has
VITAMIN C
can is
PREVENT SCURVY WATER SOLUBLE
STATEMENTS:
ORANGE IS A CITRUS FRUIT
CITRUS FRUIT HAS VITAMIN C
VITAMIN C CAN PREVENT SCURVY
VITAMIN C IS WATER SOLUBLE

Fig. 2. Sample structures.

simple, simple procedures are often the most confusing to novices. The manual's only bright spot is its sample program runs.

E1 has many other problems, as well. Although it is a compiled Basic program, it is excruciatingly slow. Other problem areas include insufficient error trapping of keyboard entries, non-recognition of lowercase letters, and erratic performance by the Forget mode.

E1 needs an enormous amount of disk space. Besides the programs on the system disk in drive zero, the data disk in drive 1 is completely filled with program overlays. Therefore, only a minimal amount of space is left on the system disk for the data base's files.

Finally, the programming techniques used to implement E1 are second rate. For example, the Basic Input statement is used throughout the program for data entry. Although Input is acceptable for personal programming efforts, it is unacceptable for commercially produced programs and gives E1 a shoddy appearance.

Conclusions

Although I applaud the idea of producing an artificially intelligent business program, it's hard to get excited about E1. Its complete lack of speed and amateur implementation reduces E1 to an almost useless program. I can't think of even one task that couldn't be done better manually or with a more traditional data-base program. With an improved manual, a great deal more speed, and a few bells and whistles, E1 could have limited use. ■

Stuffed Model 100 by Thomas L. Quindry

★★★★

The CMOS Expansion RAMs increase the Model 100's memory capacity to 64K, 128K, or 224K. PG Design Electronics Inc., 37560 Thirty-one Mile Road, Richmond, MI 48062, 313-727-2744. \$300, \$425, and \$575, respectively.

★★★★

The Data Transfer Utility Program runs on a 32K Model 100. PG Design Electronics Inc.

PG Design introduced the concept of adding an extra bank of 32K memory to the Model 100. This first breakthrough doubled the 100's user RAM. Now PG Design offers 64K, 128K, and 224K expansion RAM modules that increase your Model 100's user RAM to three, five, and eight times, respectively.

Although the 100's CPU allows access of only 32K of user RAM at a time (in addition to the 32K ROM), it also permits switching out the Tandy 32K RAM or ROM bank and substituting other, higher-capacity RAM or ROM.

Not only can you upgrade your 100 to 224K of extra RAM (seven 32K banks), but, due to its design, you can still use the ROM socket where programs on a chip can add extra utility without sacrificing RAM.

I had been using PG Design's 64K expansion RAM for the past year before installing the 224K RAM bank. The hardware looks the same, and the quality is excellent. I've had no problems.

The expansion RAM has a U-shaped circuit board that connects to the expansion bus in the cavity on the bottom your Model 100. You cannot use these expansion RAMs on the Model 102 because it doesn't have this expansion-bus cavity. A 3-volt lithium battery with a six-year shelf life provides back-up power for the expansion RAM.

A simple, one-line bank-select program is included to let you change from the original Tandy memory to any of the PG Design memory banks. This small program also allows you to select and cold-start any memory bank if a problem occurs, freezing the bank.

Since each 32K bank of memory simulates a separate computer, your programming efforts are limited to 32K for the code, all operations, and computations associated with it. Using the 224K RAM module, for example, would be like switching to one of eight different computers, each with its own set of programs. PG Design includes software to allow you to transfer data or programs from one bank to another.

The Data Transfer Utility Program

The included Data Transfer Utility Program uses about 1,600 bytes, comes on cassette, and has a loader that places it at the right memory address; you then customize it for the particular RAM-expansion module you have.

You get three other useful functions all under function-key control. You can kill or rename a file and select a forced line feed with carriage return when printing text files. The lack of a forced line feed is one of my biggest complaints about the Model 100.

The program provides two other useful bits of information: the size of each file you select by cursor and a notation on which bank you are in. Although the Data Transfer Utility Program is meant to be resident, you can disable it with a function-key command. Residency offers an advantage over PG Design's nearest competitor, who includes an expansion ROM for data transfer. Since the program is resident, you can install other ROMs without losing other functions.

I found only one problem with the Data Transfer Utility Program. Its operation is timing sensitive, and it requires that your primary 32K RAM bank be original Tandy or of the identical specifications. PG Design sells 8K RAM modules that work as well as the Tandy RAM, but 8K RAMs from some other distributors fall short of the mark.

Before PG Design's latest software update, the company recommended using Purple Computing's 8K RAM. I have used the previous Data Transfer Utility Program with my 64K RAM module and a Purple Computing 8K module with no trouble. With the updated software, the Purple Computing 8K module doesn't work, even with the 64K module. PG Design has made its timing tolerances too tight. However, for a small fee, the company does offer a trade/replacement for incompatible RAM.

I've found that the best way to use the extra RAM banks is to store programs or backups of important files. When I want to run a program or two, I use the Data Transfer Utility Program to copy the program to the first bank, much as I would from a disk drive. Then I run the program from there. If it generates a data file, I copy the data to another bank for safekeeping.

Summary

Although I recommend a disk drive for complete and efficient storage of your prized files, I find that the extra 224K holds more than I would ever use at one time. It frees me from taking my disk drive on trips. ■

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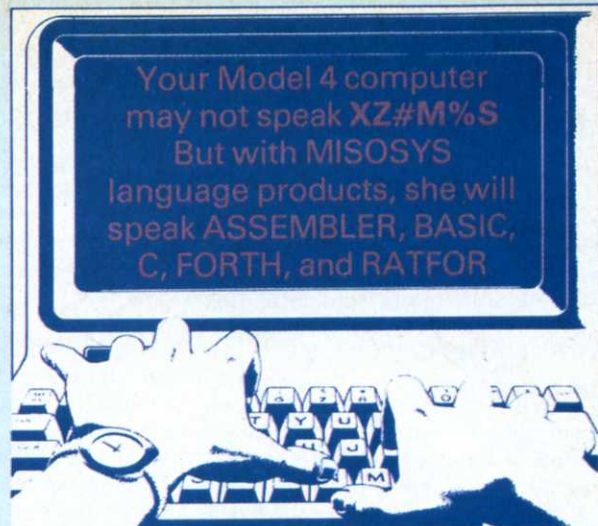
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A 4P Modem That Works

by Jack Feldman

★★★★

Teletrends TT512P Modem is an internal, 300/1,200-baud modem for the Model 4P. Teletrends Corp., P.O. Box 2198, Garden Grove, CA 92642, 714-554-7401. \$179.95.

Purchasing a Tandy computer is like joining a club. If Tandy makes a mistake, a lot of clever club members can see the flaw and find a way to make it right. The shortcoming for the Model 4P was its modem. Although the built-in modem for the transportable was a good idea, Tandy's implementation was lacking: It featured a 300-baud modem at a time when 1,200 was common and an autodialing scheme that defied logic. This modem took the 4P out of consideration as a working computer for telecommunications.

Enter the Teletrends TT512P board. This internal modem gives the 4P the telecommunications punch that makes it a serious computer for on-the-go operations. It fits neatly in place of the Tandy modem board, runs at either 1,200 and 300 baud, and uses the familiar IBM PC AT dialing protocol. And it costs little more than did the discontinued Tandy modem.

Installation

Installation is easy. First, disconnect your 4P from all power sources. Look at the rear of the computer, find the cover plate to left of center, and remove it. If you're replacing an existing modem, remove its cable from the DB25 connector and gently pull the modem card from the edge-card connector and out of the computer.

Insert the new modem in the slot and make sure the card is firmly seated. Although they were out of stock as of press time, Teletrends promises to include a replacement cover plate with the TT512P. This cover is designed to be

used in place of the 4P's cover and fastened with the screws you removed from the original plate.

Now plug the new cable into the 4P's DB25 connector and connect the modem to the phone line. You can also connect your phone to the other modular jack on the modem card.

Using the Modem

If you have a terminal program that has an autodial feature, you don't have to read the manual to get started. Fortunately, I had an autodial terminal program and a Hayes modem at hand, so the first test was to see if the modem would work without changes. Everything worked fine. There were some differences, but they were minor.

First, you do not hear the modem placing the call and making the connection. The card has no room for a speaker, so when the number dialed appears on the screen, you have to wait for the screen to tell you if you've been connected or if the modem has timed out.

As a plug-and-go system to use with software already configured for the 4P, the modem is a winner. Before reading the manual, I used the modem with a variety of terminal programs and hosts, including the following public-domain software: PTerm in Model 4 mode with TRSDOS 6.2, LTerm in Model III mode with LDOS, and MEX in Model 4 mode under CP/M.

Since the manual mentions Modem80 as a commercial package that works with the modem, I tried that, too. I found that all the packages worked perfectly.

I used the various terminal packages to dial into a variety of host computers. First, I dialed a 3B2 system and then called the Teletrends data number to leave a technical question. After that, I downloaded data from bulletin-board systems (BBSes) around the country. Finally, I called the Knowledge Index as an example of a commercial data-base search.

The TT512P also features autoanswer, which lets you use your 4P as a host computer, and speed shift, which lets you, via software, select the speed at which you access a BBS. The software and modem work together to keep your computer sending at the speed appropriate for the individual BBS.

The TT512P doesn't have a switch that lets you turn off the autoanswer. When you boot TRSDOS 6.2, the modem sets DTR (data terminal ready) to "on," whether you have a terminal program resident or not. To keep the modem from responding to an incoming call, when you boot the program use the DOS Sysgen command to turn the Setcom DTR

The Teletrends TT512P modem works well with software designed for the 4P.

parameter off. But the manual doesn't cover this.

Undocumented Information

The manual does seem brief, but the TT512P is a plug-and-go device: You plug it in, and it works nicely with the 4P. However, you'll need further technical information if you intend to set up a BBS.

The manual doesn't include a technical help phone number. Although the company backs its product with a generous two-year warranty, you'll have to find its ad in *80 Micro* if you need to phone for help.

The manual refers to result codes, but it doesn't tell you what they are. The screen displays one of six result codes (for instance, connect, no carrier, ring), which indicate the modem's response to input from the computer or the line.

You can use the F code to put the TT512P in half-duplex mode, but the manual doesn't tell you about this, either. This lack of technical information isn't fatal, but it does make it difficult to get full use of the modem. The manual doesn't mention that you can use the TT512P as part of a BBS; to do so, the modem has to signal the computer that a call is coming in at either 300 or 1,200 baud. The technical section of the Teletrends BBS said that the modem had this feature, but it didn't explain how it works.

When you use a Hayes-type modem, you have to make a special cable that connects pin 12 on the modem to pin 22 on the computer. Once again, since this is a dedicated modem, the proper connection is built into the cable.

Conclusion

The Teletrends TT512P modem is well made and functions as promised. It works well with software designed for the 4P and lets you use the computer as a terminal or host. However, its manual's lack of technical information makes it more difficult to get to all the modem's features. ■

The TT512P makes the 4P a serious computer for on-the-go operations.

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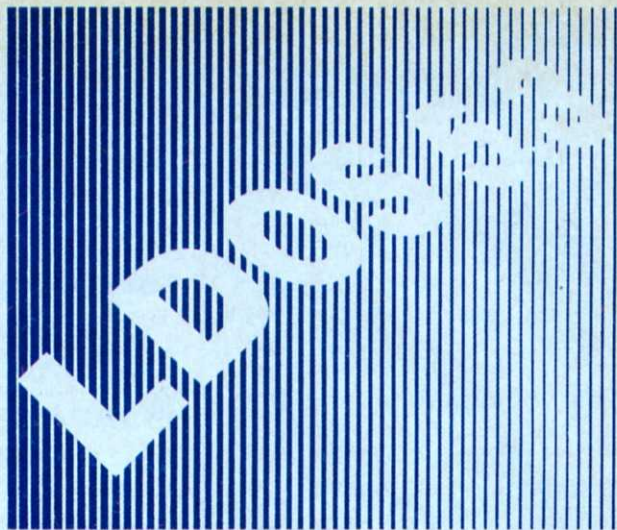
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REVIEWS

Words and Pictures by Harry Bee

★★★★

A-Plus ETG runs on the Models 1000/1200/3000 (256K) and requires one disk drive. Savtek Corp., P.O. Box 1077, Waltham, MA 02254. 617-891-0638. \$89.95.

It's easy to find a high-quality word processor for under \$100 these days. The difficulty is choosing one from the many; a new product vying for your attention must have something special to stand out from the crowd. A-Plus has what it takes.

A-Plus ETG combines a fine, medium-duty, what-you-see-is-what-you-get (WYSIWYG) word processor, A-Write, with a capable, paint-like graphics program, A-Draw, to let you create and print illustrated documents. The presentation is attractive and slick. Its implementation is almost faultless. A-Plus is easy to learn and use, yet the elements that make it easy don't get in your way. In addition, it has a full complement of file-management utilities, a clock with an alarm and a timer, a perpetual calendar (from 1582), and a six-function calculator.

The program installs easily on floppy- or hard-disk systems. Because the package is so feature rich, many program overlays and auxiliary files must be available while you work. As a result, moving between major programs is a bit slow. More importantly, because these files take up so much space on the program disk, I found a single floppy drive inadequate for using the program effectively. Two drives should be the minimum system.

A Matter of Appearances

Subtitled "The Home Work Solution," A-Plus aims for the school and home user, and nothing about the package creates a misleading impression. As a result, it is an excellent product in its intended environment.

The language of its more than 300 pages of documentation is careful and patient. The manual is thorough with plenty of illustrations, and it is fully indexed. I particularly liked the hints, usually several of them about each function, that suggest less obvious ways to get the most out of the program. In addition, plenty of context-sensitive help screens are available from inside the program, and a quick-reference card and sample files come with the package.

A-Plus's screens are clean, well-designed, and clear. You can access every function by menu selection: You highlight your choice with the arrow keys

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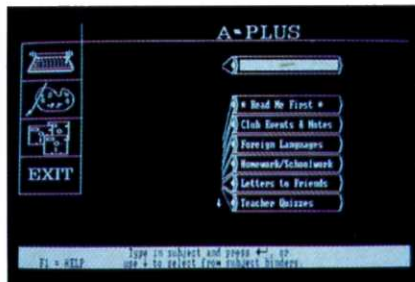
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and press the enter key. But you can also select every function with a one-, two-, or three-key command. Furthermore, express keys let you move between the major programs without having to go through the main-menu screens. In certain cases, you can get rid of the menus altogether.

For instance, within the word processor at the lowest help level, the bottom half of the screen is filled with menus. To accomplish any function, you can page through the menus until you find the one you want, then highlight and select it. If a subcommand is necessary, you find yourself in a pull-down menu with further choices. However, the menus also show you the alphabetical key you need with the control key to issue the same command. Soon, you'll need menus for reference only. When you've learned the commands sufficiently, you set the next help level, which removes the menus from the screen.

A-Write

The word processor gives you a complete set of standard editing tools, including search and replace, block cut



A-Plus allows you to insert a chart into text.

and paste, copy, and move. You can print a block of text, but you must save it as a separate document first. Cursor control is good, and scrolling is generally quick. (Since files are disk-based, you sometimes have to wait for sections to load.)

Your document can include up to five separate paragraph formats specifying tabs and margins (up to 78 columns wide only), line spacing, and justification. A double-spaced paragraph appears that way on the screen. A margin release allows outdenting and line positioning to let you center titles. Page for-

matting includes headers, footers, and automatic numbering.

On the screen, bold, underlined, italicized, and super- and subscripted characters appear that way. Special characters cover the needs of most European languages; symbols and Greek letters facilitate math and science writing.

The most impressive of A-Plus's WYSIWYG features is the concurrent display of graphics. You can bring a drawing, illustration, chart, or headline, created with A-Draw, into your document. Once you've imported a graphic, you can move it until it's where you want it. Graphics can interrupt your text, as with a heading, or you can run text beside them. Using the margin release, you can type over or inside a graphic to make bordered text and labeled illustrations.

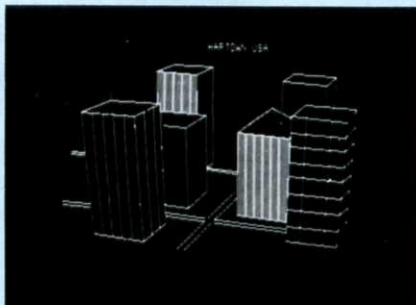
Whether you can print what's on the screen depends on your printer. A-Plus uses printer-specific drivers; it doesn't support all printers. The version of the program I tested included 18 drivers covering about 24 popular printers. Mine wasn't among them. However, the people at Savtek Corp. are eager to de-

Continued on p. 112

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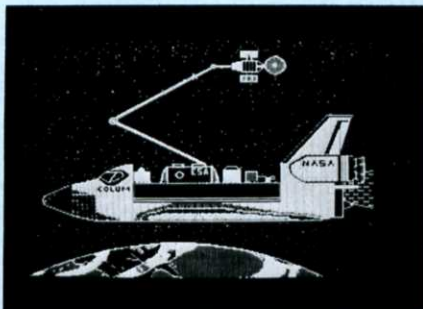
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Superior Software. The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2; DOSPLUS 3.4, 3.5, 4; LDOS; and Newdos80. The Grafyx Solution is also supported by over 20 optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Mathplot, Surface Plot, Chess, Slideshow, etc.

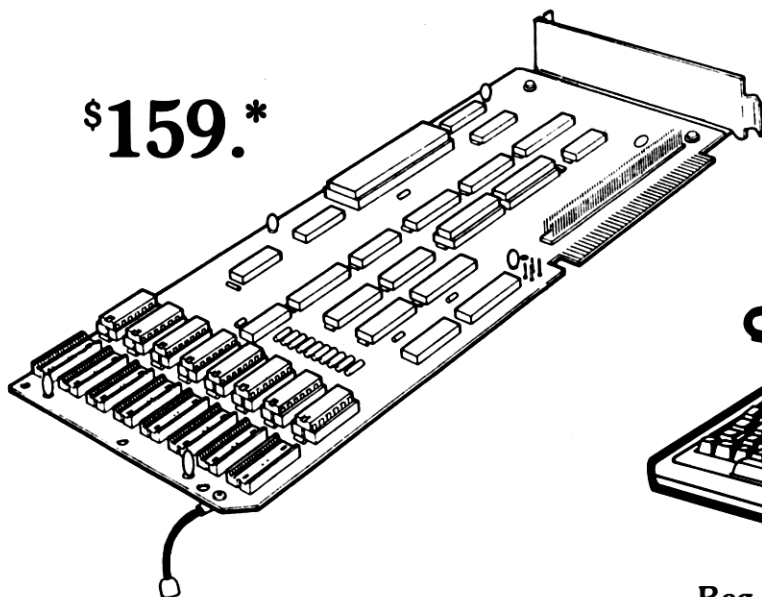
The Grafyx Solution package is shipped complete for \$199.95 (reduced from \$299.95). The manual only is \$12. Payment may be by check, Visa/MC, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 5% tax.

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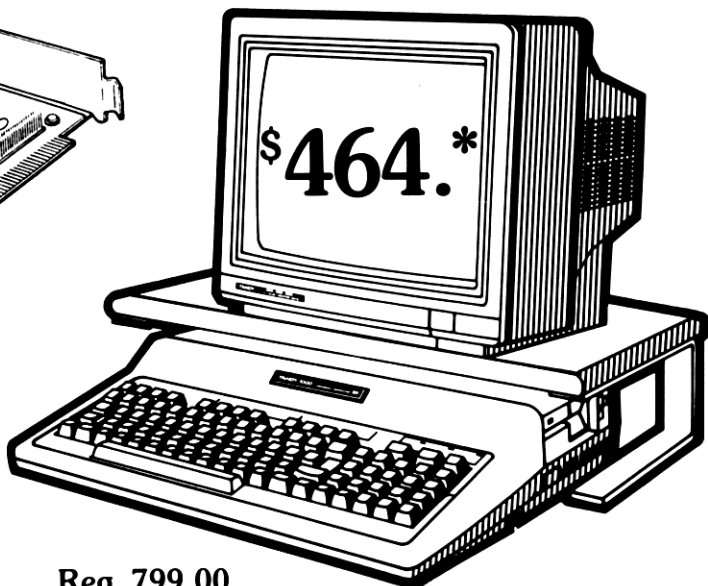
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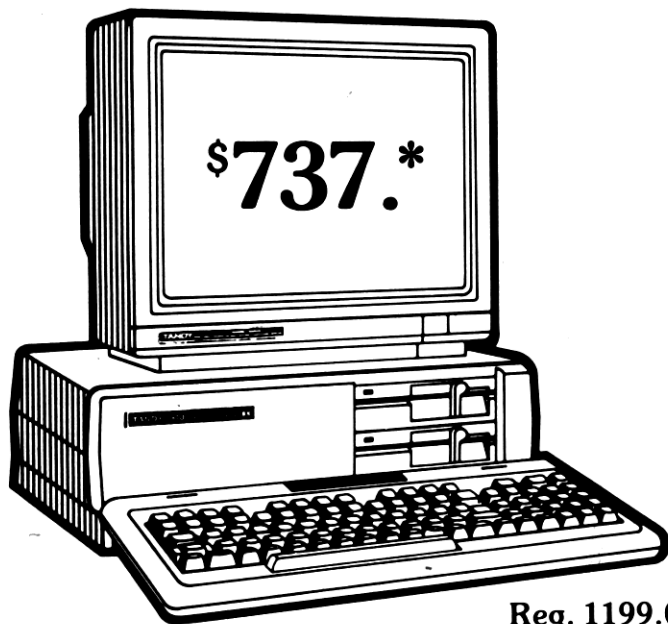
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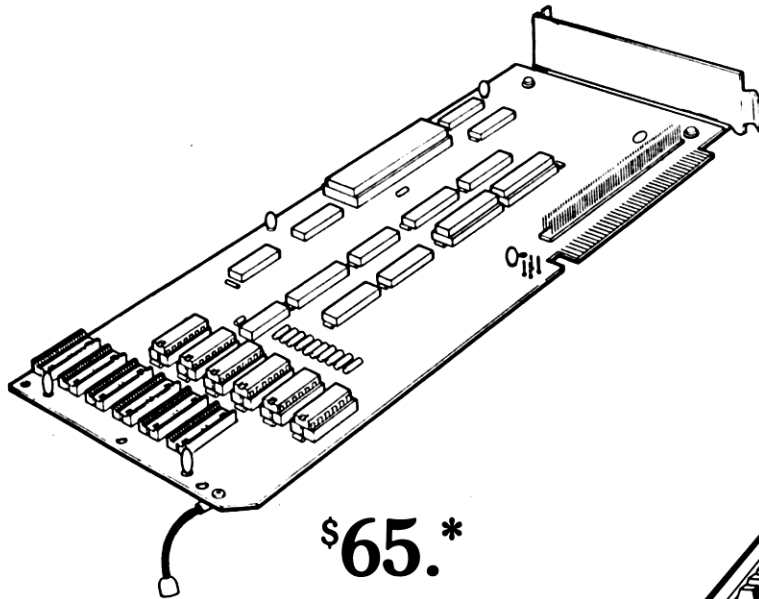
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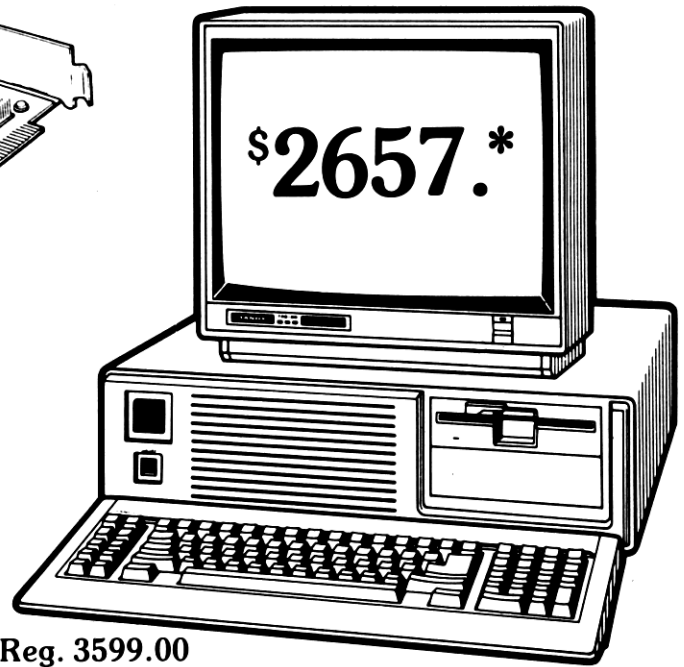
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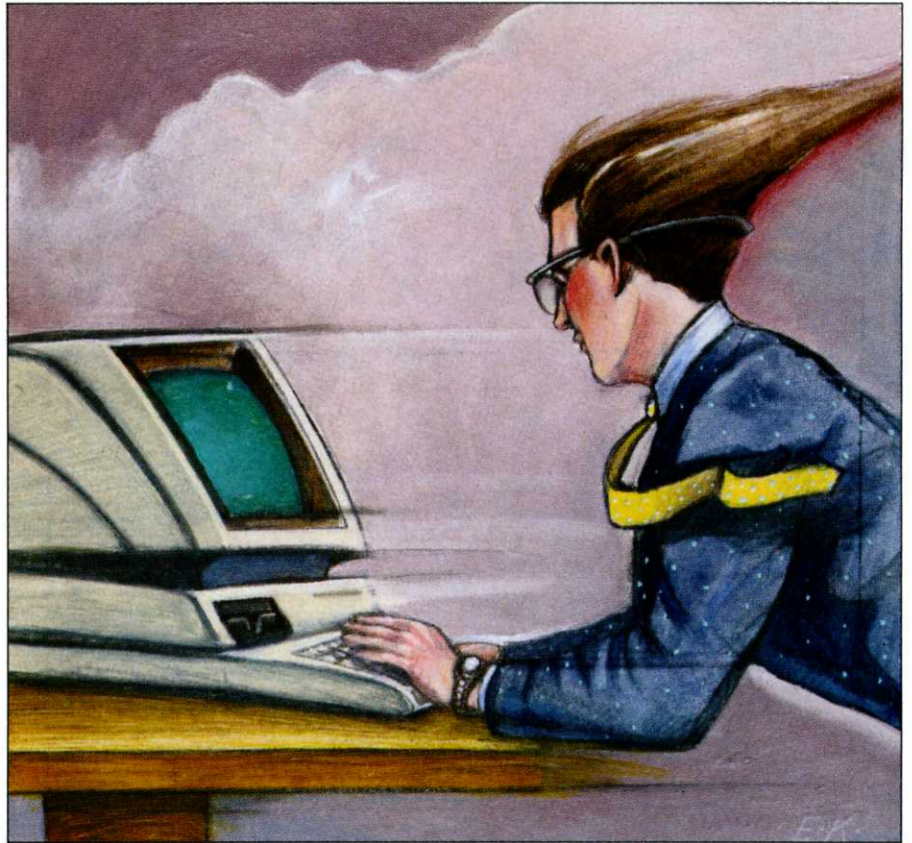
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Quick Boot



**Bypass the 1000's memory test
on a warm reboot.**

by Dave Rowell

Sixteen seconds isn't long—roughly the time a Tandy 1000 takes to test 640K of RAM during a reboot. If you reset your 1000 a few times a day, however, those 16-second delays can become annoying. IBM owners don't have to put up with this, nor do owners of other compatibles.

Now you don't either, because I've got

a program that reboots Tandy 1000s without the memory test. With Reboot loaded, you press the control-alternate-delete key sequence and your 1000 hops to it, immediately loading in the boot sector from your start-up drive.

If you're uncomfortable with assembly language, you can create Reboot with a Basic program (Program Listing 1, Reboot.BAS). The sidebar describes how to do this (see p. 48) and how to make a Config.SYS file that loads Reboot when you turn on your computer.

If you have an assembler, use Program Listing 2, Reboot.ASM, written for Microsoft's MASM. Reboot is meant only for Tandy's 1000 series. It is unnecessary on other PC compatibles, which provide a warm boot without a memory test.

Illustration by Earl Keleny

System Requirements

**Tandy 1000
MS-DOS 2.x to 3.20
GW-Basic or Microsoft
Assembler 1.0 or later**

Reboot is a memory-resident program (Reboot.SYS) that loads as a device driver from a Config.SYS file. (I'll explain why a device driver later.) Once resident, it takes only 400 bytes of RAM. The program monitors keyboard input by filtering the keyboard hardware interrupt (9) and performs a warm boot when it detects the standard reboot key sequence (control-alternate-delete).

Easy to Remember

The BIOS keyboard-handler routine never gets to read the three-key combo, and the 1000's normal reboot procedure is avoided. I chose to usurp the standard reset sequence because it's one of the few key inputs that Microsoft Windows lets through to the BIOS keyboard handler. It's also easy to remember, and you've still got the red button if you need a full reboot.

The program reboots your 1000 by invoking the bootstrap-loader routine (interrupt 19 hexadecimal [hex] or INT 19H) that MS-DOS provides. INT 19H resets the boot drive, then loads and runs the boot program from the first sector of the boot disk.

The boot program loads the MS-DOS system files into memory, which in turn load Command.COM, and you've got your DOS prompt without the memory check. However, memory-resident programs and some device drivers create complications in both MS-DOS versions 2 and 3.

Under MS-DOS 2, the reboot sequence that INT 19H starts doesn't reset the addresses in the interrupt vector table to the original values that the ROM BIOS sets during the first boot.

Most memory-resident programs alter hardware-interrupt vectors to point to their own interrupt handlers in RAM. These handler routines are usually written over during DOS initialization, however, so that INT 19H leaves hardware-interrupt vectors pointing to inappropriate code.

When the clock chip, for instance, signals for an interrupt, as it does 18 times per second, the CPU executes the now-bogus code to which the clock-interrupt vector now points, and the computer freezes up.

To avoid the problems memory-resident programs create, Reboot stores all interrupt vectors that the 1000's ROM BIOS boot-up code sets. Reboot stores the first 32 vectors (zero-1FH), and 40H, 41H, and 44H during its installation as a device driver.

Later, when you initiate the three-key reboot, the program restores the saved interrupt vectors, zeroes out all other vector-table entries, and executes INT 19H. (To

find which interrupt vectors the ROM sets, I wrote a boot-sector program that prints out the contents of the interrupt-vector table at boot-up.)

Reboot also stores and restores the equipment word (address 0:0410H) and the top-of-memory word (0:0413H). Ill-behaved programs sometimes change this important data in the BIOS data area and don't tell DOS about it.

I wrote Reboot as a device driver to get it working as soon as possible in the booting process. It's a Trojan horse to get a memory-resident program into operation before other device drivers and programs can alter the hardware interrupts. Fortunately, the DOS doesn't change any hardware-interrupt vectors before Reboot loads.

The program is a dummy device driver that performs no device functions except initialization. You must load Reboot.SYS before any device drivers that change hardware-interrupt vectors. Put it first in Config.SYS, except in unusual cases in which you must load another driver first.

Avoids Hang-ups

With MS-DOS 3.20, Microsoft attempted to protect INT 19H from the hang-ups that memory-resident programs cause. DOS 3.20 stores important vector values so that the 3.20 INT 19H can restore them before loading in the boot sector.

However, DOS 3.20 doesn't read and store the interrupts until all device drivers are loaded. If any device driver (including Reboot.SYS) intercepts hardware interrupts, INT 19H restores vectors pointing to the overwritten device-driver interrupt handlers, and booting fails.

Although the DOS 3.20 INT 19H interrupt-restore routine is in RAM (part of IBMBIOS.COM), DOS changes the INT 19H vector to point to it before loading device drivers, so Reboot can't bypass it. However, the 1000's MS-DOS 3.20 has a 1-byte flag at address 0070:1D1FH that determines whether the INT 19H will restore hardware interrupts.

If Reboot determines that it's running under 3.20, it sets that byte to zero, preventing INT 19H from changing the vectors that Reboot has restored. MS-DOS 3.10 does not attempt to restore hardware interrupts.

Even though Reboot.SYS is a dummy device driver, it must adhere strictly to device-driver format and rebuff any calls that could be made to it as a device (see "A Driver of Your Own Device," by Robert D. Covington, *80 Micro*, July 1986, p. 40, for details).

The device header under the label Header (Listing 2) is standard for a serial device. It's important to make the actual device name in the header different from the name of the file itself. Once a device is installed, you can't copy, rename, or delete any file of the same name, no matter what the extension—a problem when you're debugging or experimenting with a new device driver. The name in the header is Rboot; the file itself is Reboot.SYS.

The driver-function request handler, starting at label INTR, takes requests from DOS, but any device function other than initialize (code zero) results in an immediate return with the done bit (8) set. DOS only requests the initialize function (label Install) once at boot-up.

Reboot's initialize function stores the important interrupt vectors and other information needed later, sets up the keyboard-interrupt vector (9) to point to a handler in Reboot, then frees up the now unneeded initialization code (placed at the end of the driver) so DOS can use that space.

First, the initialization routine gets the DOS version and stores it. Reboot must treat version 3.20 differently when it reboots. The DOS version function is one of the DOS services available to device drivers during initialization.

The DOS function for getting the vector of a particular interrupt is not available to device drivers. But because the vectors that Reboot stores are contiguous, the 8086 family's powerful string commands make getting and storing the two-word vectors quick and easy.

Saves Instructions

The segment:offset combination of DS:SI points to the source at the bottom of RAM, and ES:DI points to the destination table in Reboot. The CPU automatically increments the pointers SI and DI, saving a few instructions. The equipment list and top-of-memory words are found down in the BIOS data area starting at segment 0040 hex.

Before setting INT 9 to point to its own keyboard handler, Reboot saves the current INT 9 vector. For all key presses except the control-alternate-delete reboot combination, Reboot's keyboard handler will pass control to the original handler.

Again, the DOS interrupt-vector functions aren't available during device installation, so Reboot writes the new vector itself, first disabling maskable interrupts. Otherwise, you could press a key, and the keyboard-hardware interrupt could be called when its address was only half-

changed, freezing the computer.

After setting up its interrupt handler, Reboot displays a loading message, then sets the break address in the request header that DOS uses to communicate with the driver. Now that the installation code has done its job, Reboot casts it away, starting at the label Install (the break address).

Once installed, Reboot becomes a hardware-interrupt handler. The interrupt routine is never a working part of the device driver, but the driver sets it in place and activates it.

Reboot's interrupt handler monitors codes that the keyboard sends to represent key presses and releases. When it detects a press of the delete key (scan code 53H), Reboot checks a byte in the BIOS data area (address 0:417H) that keeps the status of special keys like the control and alternate keys.

If bits 2 and 3 of this byte are set, then both of these keys are currently pressed, and Reboot jumps to its reset routine. If the delete key isn't pressed, or both keyboard-status bits aren't set, Reboot sends control to the normal keyboard interrupt handler in ROM.

I used the string functions again to transfer the stored addresses back to the interrupt-vector table. Interrupt handlers can't easily use the DOS function that changes interrupt vectors, because the DOS services aren't re-entrant.

If a handler interrupts code that's in the middle of a DOS interrupt itself, calling DOS again destroys information on the DOS stack belonging to the interrupted code. In Reboot's case, it might not matter, because the warm boot wipes the slate clean anyway.

Regardless, I used the string functions because they're easier to use, given the large number of interrupts changed. Interrupts must be disabled (with the CLI instruction) when altering interrupt vectors to prevent a higher-priority hardware interrupt (only the clock in this case) from using a vector that's only half changed.

After restoring the equipment list and top-of-memory words, Reboot checks the DOS version. If it's version 3.20, the program zeroes the flag that determines whether or not DOS restores hardware interrupts itself. Reboot then clears the screen and resets the video mode to the boot-up default: 80-column black and white.

DOS must also have a stack area during reboot. Reboot uses the same one that the ROM BIOS sets up for the boot program—the top 256 bytes of the interrupt vector table.

The last step before invoking INT 19H is to signal the keyboard that it can send further scan codes and to signal the interrupt-controller chip that this interrupt is over. (See Dave's MS-DOS Column, 80 Mi-

Program Listing 1. Reboot.BAS.

```

1 FILE.SIZE% = 615
2 OPEN "R",1,"REBOOT.SYS",1 'record size of 1
3 FIELD #1,1 AS X$
4 PRINT "Creating REBOOT.SYS."
5 FOR I% = 1 TO FILE.SIZE% : READ X
6 LSET X$=CHR$(X) : PUT #1 : NEXT I%
7 CLOSE
8 PRINT "REBOOT.SYS created."
9 END
10 DATA 255, 255, 255, 255, 0, 128, 22, 0, 33, 0
11 DATA 82, 66, 79, 79, 84, 32, 32, 32, 0, 0
12 DATA 0, 0, 46, 137, 30, 18, 0, 46, 140, 6
13 DATA 20, 0, 203, 80, 83, 81, 82, 86, 87, 30
14 DATA 6, 14, 31, 196, 62, 18, 0, 184, 0, 0
15 DATA 38, 138, 93, 2, 128, 251, 0, 117, 3, 232
16 DATA 77, 1, 13, 0, 1, 38, 137, 69, 3, 7
17 DATA 31, 95, 94, 90, 89, 91, 88, 203, 0, 0
18 DATA 0, 0, 0, 0, 0, 0, 0, 251, 80
19 DATA 30, 228, 96, 60, 83, 117, 13, 51, 192, 142
20 DATA 216, 160, 23, 4, 36, 12, 60, 12, 116, 8
21 DATA 31, 88, 250, 46, 255, 46, 78, 0, 31, 88
22 DATA 14, 31, 190, 247, 0, 191, 0, 0, 142, 199
23 DATA 185, 64, 0, 252, 250, 243, 165, 251, 185, 64
24 DATA 0, 184, 0, 0, 250, 243, 171, 251, 185, 10
25 DATA 0, 250, 243, 165, 251, 185, 118, 1, 184, 0
26 DATA 0, 250, 243, 171, 251, 161, 82, 0, 38, 163
27 DATA 16, 4, 161, 84, 0, 38, 163, 19, 4, 161
28 DATA 86, 0, 61, 3, 20, 114, 12, 184, 112, 0
29 DATA 142, 192, 187, 227, 31, 38, 198, 7, 0, 184
30 DATA 2, 0, 205, 16, 184, 0, 6, 183, 7, 185
31 DATA 0, 0, 186, 79, 24, 205, 16, 184, 48, 0
32 DATA 142, 208, 188, 0, 1, 250, 228, 97, 12, 128
33 DATA 230, 97, 36, 127, 230, 97, 185, 3, 0, 176
34 DATA 32, 230, 32, 226, 250, 205, 25, 0, 0, 0
35 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
36 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
37 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
38 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

```

Listing 1 continued

How to Create and Use Reboot.SYS

Using the Basic that comes with your Tandy 1000 and Program Listing 1, you can create Reboot.SYS. After loading Basic, type in the listing and save it as Reboot.BAS. Running Reboot.BAS from Basic creates the file Reboot.SYS. Copy the newly created Reboot.SYS to your boot-up disk.

You load Reboot.SYS and make it active in a file called Config.SYS. If there is no Config.SYS on your boot disk, you can use the Copy command to create it by typing the following three lines at the DOS prompt:

```

COPY CON CONFIG.SYS
DEVICE = REBOOT.SYS
^Z

```

The third line is the end-of-file marker (control-Z). To enter this line, press F6 and then the enter key. DOS then creates a file named Config.SYS with the line DEVICE = REBOOT.SYS.

If you already have a Config.SYS file on your boot disk, you must edit it and insert a new first line containing DEVICE = REBOOT.SYS. You can use Edlin or any word processor that creates pure ASCII files. You can also use the following series of DOS commands to add a new first line to Config.SYS:

```

REN CONFIG.SYS CONFIG.ADD
COPY CON CONFIG.SYS
DEVICE = REBOOT.SYS
^Z
COPY CONFIG.SYS + CONFIG.ADD
TYPE CONFIG.ADD
TYPE CONFIG.SYS

```

The first command renames the existing Config.SYS. Then the Copy command creates a new Config.SYS file containing DEVICE = REBOOT.SYS. (See above for instructions on this particular process.) The next Copy command appends the old Config.SYS (Config.ADD) onto the new Config.SYS.

Use the two type commands to make sure the new Config.SYS is the same as the old, but with the new first line that loads Reboot.SYS. If the new Config.SYS meets your approval, delete Config.ADD.

To activate Reboot, make sure both Reboot.SYS and your new Config.SYS are in the root directory of your boot disk. Then reboot your computer. You should see a message indicating that the Reboot driver is loaded. Your computer should function as usual after this procedure.

To activate a warm boot without a memory check, hold down the control and alternate keys, and press the delete key. As with a normal reset, don't invoke Reboot during a normal drive operation. You could damage the disk directory.

Reboot works on Tandy 1000s with MS-DOS version 2 or 3 up to version 3.20. If it ever happens that Reboot doesn't respond to the three-key reset sequence, or it fails to boot properly, you can always resort to your 1000's red reset button. ■

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[illegible]

```
name      reboot
page      55,80
title     'REBOOT.SYS --- Tandy 1000 device to reboot quickly'
```

```

; REBOOT.ASM
; When you press Ctrl-Alt-Del on a Tandy 1000, an involved reboot is
; initiated. (On the IBM only a short boot with no memory test occurs.)

```

Listing continued

cro, November 1986, p.80, for details on the workings of the keyboard and interrupt hardware.) Reboot sends several end-of-interrupt signals to the interrupt-controller chip in case any lower-priority hardware interrupts are pending. Finally, Reboot initiates a warm boot with INT 19H.

Interrupts are kept enabled during Reboot's resident routine (with the STI instruction), so the the clock-tick interrupt (INT 8) can continue to update the system timer. All other hardware interrupts are lower priority; therefore, they are disabled until the end-of-interrupt signal is sent to the interrupt-controller chip.

If you're interested in this kind of programming, here are two books you'll find helpful: *Advanced MS-DOS*, by Ray Duncan (Microsoft Press, 1986), covers interrupt handlers, device drivers, and the booting process. *The Norton Programmer's Guide to the IBM PC*, by Peter Norton (Microsoft Press, 1985), covers interrupt handlers, system information stored in low memory, and other topics. ■

Dave Rowell is a staff writer for PC Resource magazine. Write to him c/o 80 Micro, 80 Elm St., Peterborough, NH 03458.

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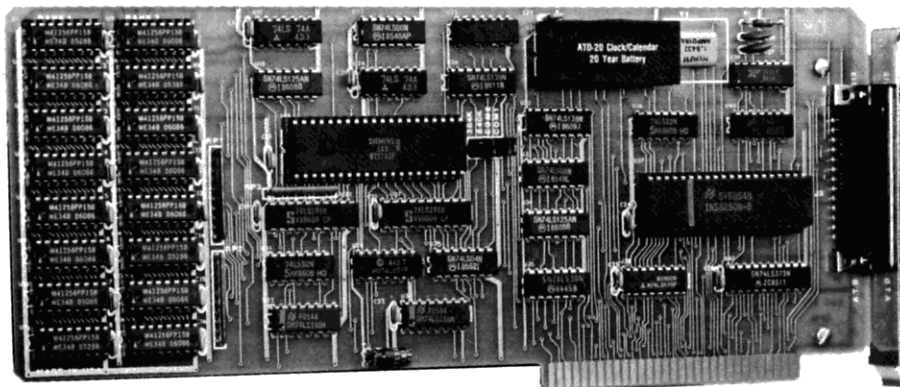
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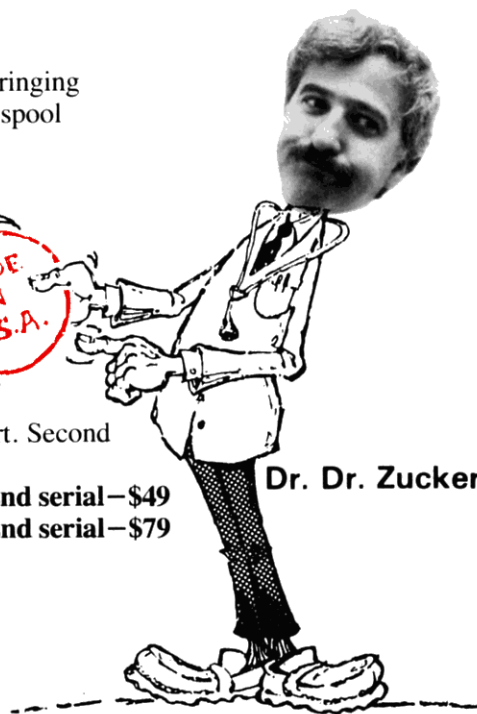
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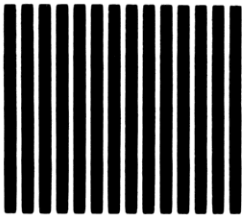
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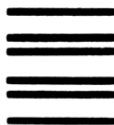
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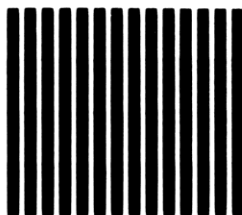
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```

; Many people with 640K of memory find waiting 16 seconds for a memory
; check annoying. This program (Reboot) monitors keyboard input, and
; performs a warm reboot when you press the reboot key combination.
;-----
equipment_adr equ 410H ;offset from 0 of equipment list word
memorytop_adr equ 413H ;offset of top-of-memory word
keystatus_adr equ 417H ;offset of keyboard status byte (0:417H)
dos320bios_seg equ 0070H ;segment where DOS 3.20 IBMBIOS.COM resides
dos320flag_adr equ 1fe3H ;offset of DOS 3.20 INT 19H flag

code segment public 'CODE'
;code segment begins

REBOOT proc far
org 0 ;device drivers originate at 0
assume cs:code, ds:code, es:code

; Header for device driver.

header dd -1 ;-1 means end of list (DOS will change)
dw 8000H ;device attribute word (character device with
; no special properties)
dw strat ;strategy entry point
dw intr ;interrupt entry point
db 'REBOOT' ;8-character device name (3 blanks at end)

; Local storage for DOS-passed request header address.

req_head dd ?

; Strategy routine for device driver stores address of request header
; passed in es:bx by DOS.

STRAT proc far
mov word ptr cs:[req_head],bx ;request header offset
mov word ptr cs:[req_head+2],es ;request header segment
ret ;far return to DOS

STRAT endp

; Interrupt routine for device driver handles all function requests. It
; grabs necessary information from request header pointed to by req_head.
; This is a dummy driver. If the request command code in the header is 0
; (initialize), it sets up the Reboot resident keyboard interrupt handler
; in memory. This happens only once (during device installation). With any
; other code, a dummy routine sets the return status to done and returns.

INTR proc far
push ax
push bx
push cx
push dx
push si
push di
push ds
push es

push cs ;use ds for local data
pop ds

di,[req_head]
point es:di to request header
ax,0 ;set zero for initial status word
mov bl,es:[di+2] ;put command byte in bl
cmp bl,0 ;is it zero (initialize)?
jne intout ;if not then dummy device return
call install ;install memory resident Reboot

intout: or ax,0100H ;set done bit (8) in status word
mov es:[di+3],ax ;return status to request header

```

Listing continued

```

pop es
pop ds
pop di
pop si
pop dx
pop cx
pop bx
pop ax

ret ;far return to DOS

; Resident Int 9 handler. If Ctrl-Alt-Del pressed, reboot initiates reset
; without memory check.

keyboardint dd ? ;storage of previous BIOS INT 9 vector
equipment dw ? ;storage of original equipment word
memorytop dw ? ;storage of original top-of-memory
dosversion dw ? ;version of MS-DOS

; The keyboard interrupt handler (short and quick) starts here.

keyboard:
sti ;enable interrupts (only the clock)
push ax ;used registers must be restored
push ds
in al,60H ;read 8255A-5 (PPI) keyboard data
cmp al,53H ;is it Del key scan code?
jne out ;if not the Delete key
xor ax,ax ;point ds to memory bottom
mov ds,ax
mov al,ds:byte ptr keystatus_adr ;get keyboard status byte
and al,12 ;mask for Ctrl and Alt bits (2&3)
cmp al,12 ;is Ctrl/Alt key combo active?
je reset ;if yes, then reboot
pop ds
pop ax

out:
pop ds
cli ;disable maskable interrupts
jmp cs:keyboardint ;pass to old int. service routine
reset: pop ds ;restore used registers
pop ax

; Restore ROM interrupt vector table from int table. Zero out rest of vector
; area. ds:si is source and es:di is destination for string block moves.

push cs ;point ds to this segment
pop ds
mov si,offset int_table ;ds:si is source (int_table)
mov di,0 ;point es:di to 0:0--real vector table
mov es,di
mov cx,64 ;move 64 words from table
cld ;direction up
cli ;no interrupts allowed while changing
rep movsw ;block word move til cx=0
sti ;reenable interrupts
mov cx,64 ;going to fill next 64 words with 0
mov ax,0 ;from AX
rep stow ;store 64 0 words, only di increments
sti
mov cx,10 ;move ten stored words
cli ;from ds:si to es:di
rep movsw
sti
mov cx,374 ;374 words in table above int 44H
mov ax,0 ;fill with 0s
cli
rep stow
sti

; Restore original equipment list and top-of-memory word. (es still at 0.)
mov ax,equipment ;get stored word
mov es:word ptr equipment_adr,ax ;put back in data area

```

Listing continued

Listing continued

```

mov ax, memorytop
mov es:word ptr memorytop, ax
; same with top-of-memory

; If MS-DOS version 3.2, change INT 19H flag in RAM section of BIOS to zero.
; This section will have to be augmented for future versions of MS-DOS.

mov ax, dosversion
cmp ax, 1403H
jbe cls
mov ax, dos320bios_seg
mov es, ax
mov bx, dos320flag_addr
mov byte ptr es:[bx], 0

; Clear screen with BIOS video interrupt (10H). (At this point, the BIOS
; interrupt is pure, and only the clock hardware interrupt is working.)

cls: mov ax, 0002H
int 10H
mov ax, 0000H
int 10H
mov bh, 7
mov cx, 0
mov dx, 184fH
int 10H

; Set up new stack area using top 128 words of interrupt vector table (used
; by ROM during booting). (128 words = 256 bytes = top 1/4 of table.)
; No interrupt can occur immediately after a 8088 segment register is changed,
; so no need for disabling interrupts between changing ss and sp.

mov ax, 30H
mov ss, ax
mov sp, 100H

; Reenable keyboard input (via programmable peripheral interface-PPI) and
; send end-of-interrupt signal to programmable interrupt controller (PIC).

cli
in al, 61H
or al, 80H
out 61H, al
and al, 7FH
out 61H, al
mov cx, 5
mov al, 20H
out 20H, al
loop eoi

int 19H
; ROM bootstrap loader (finally)

; Storage table for initial ROM vector table.

int_table dw 64 dup (0)
dw 10 dup (0)
; room for the first 32 vectors
; room for vectors 40-44

; Start of installation routine. Memory from here on will be released
; after initialization.

INSTALL proc near
push es
push di
; save address of request header

; Get and store DOS version so that DOS versions 2 and 3 can be treated
; differently. This DOS function call is available at driver installation.
; DOS version function call
mov ah, 30H
int 21H
mov dosversion, ax

; Store ROM interrupt vectors (0-1F and 40, 41 and 44 hex) in program table.
; point es to this segment
push ds
pop es

```

Listing continued

Listing continued

```

mov di, offset int_table
mov si, 0
mov ds, si
mov cx, 64

cld
movsw
mov si, 0100H
mov cx, 10
movsw
push cs
pop ds
; restore ds to this segment

; Store equipment byte and top-of-memory.

xor ax, ax
mov es, ax
mov ax, es: word ptr equipment_addr
; point es to memory bottom
; get current equipment list
mov equipment, ax
; store here
mov ax, es: word ptr memorytop_addr
; same for top-of-memory
mov memorytop, ax

; Get and save current address of INT 9 so that resident Reboot can pass
; control to the original interrupt routine. (es still at 0.)

mov di, 4*9
mov ax, es:[di]
; address of int 9
; es still at 0
mov word ptr ds:keyboardint, ax
; store int vector offset
mov ax, es:[di+2]
; new segment
mov word ptr ds:keyboardint+2, ax
; store int vector segment

; Reset low-level keyboard interrupt to point to Reboot routine.

mov ax, offset keyboard
cli
; disable maskable interrupts
mov word ptr es:[di], ax
; new offset
mov es:[di+2], cs
; new segment
sti
; reenale interrupts

; Display driver loading message.

mov ah, 9
mov dx, offset message
int 21H

; Set break address in request header to cut off installation procedure.
; recover request header address
pop di
pop es

mov dx, offset install
; end of resident code
mov es:[di+14], dx
; offset of driver end
mov es:[di+16], cs
; segment of driver end

mov ax, 0
; zero out status word

ret
; near return

; Data for installation (nonresident).

message db 13, 10, 10
db 'M1000 Reboot driver loaded. <Ctrl-Alt-Del>'
db 13, 10, 10
db 'Copyright 1987 -- 80 Micro Magazine'
db 13, 10, 10, '$'
db 'Written by Dave Rowell'

INSTALL endp
INTR endp
REBOOT endp
; end of main routine
; -----
CODE ends
; code segment ends
end

```

End

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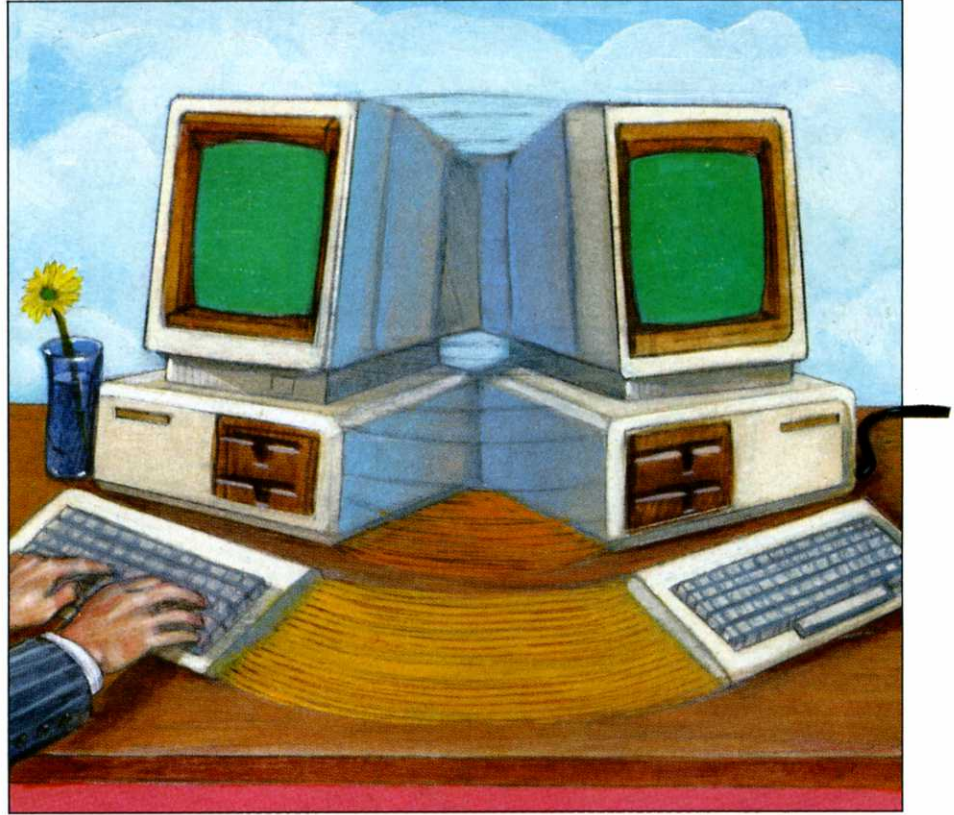
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Leave the Printing



Set up a RAM buffer to free your Tandy 1000 while printing out files.

by David A. Williams

A spooler, one of the most useful utilities you can own, frees your computer to perform other tasks while your printer slowly grinds out the great American novel or the world's largest spreadsheet. A spooler can use a RAM buffer, a disk buffer, or a combination of the two.

Spooli (see the Program Listing) uses

System Requirements

**Tandy 1000/1200/3000
Assembly language
Editor/assembler
Parallel printer**

the first method. It places characters that would otherwise be sent directly to your printer into a reserved 64K block of memory. The characters remain in that block until your printer is ready to take them. Spooli then doles out characters to your printer while your computer appears to be devoting its full attention to its next task. Spooli includes commands that let you purge the buffer and make duplicate copies.

A print spooler should be transparent, meaning that, except for the fact that your documents appear to print much faster, everything should work as usual. A spooler should be fast, allow your printer to operate at normal speed, and be adaptable to your hardware configuration. It

Illustrations by Earl Keleny

to Spooli

should not require an inordinate amount of memory and must have the features you need.

I tried several commercial spooler programs and did not find one that satisfied all of the above criteria. You might not like everything about Spooli, but you can easily customize it to fit your requirements.

I tried to keep Spooli simple. The program's buffer is fixed at 64K bytes and only services printers that are connected to the LPT1 parallel port. You can change the port address, but you cannot use Spooli to run two parallel printers or a serial printer.

How It Works

Spooli is memory-resident and consists of an initialization program, several routines that either replace or supplement existing interrupt routines, and a 64K buffer. The initialization routine runs once when you load the program. The routine uses DOS function calls 35 and 25 to replace the interrupt vectors for the timer interrupt, 08 hexadecimal (hex); the keyboard interrupt, 09 hex; and the basic input/output system (BIOS) printer interrupt, 17 hex.

The routine then calculates the buffer's starting address, ensures that it starts on a segment boundary, and tells DOS how much memory to reserve for the program and the buffer.

BIOS interrupt 17 hex has three functions: send a character, initialize a port, and test printer status. Spooli provides for all three functions, but the characters go into the buffer instead of going directly to the printer. Since the buffer does not need to be initialized, 17 hex merely reports printer status.

The buffer occupies one full segment, 64K bytes. Two pointers, In_PTR for input and Out_PTR for output, keep track of the data flow. I chose to use this size in order to simplify the design. When the pointers reach the top, FFFF hex, they overflow to 0000 hex and start over from the bottom. This circular organization allows Spooli to handle print jobs that are larger than 64K, but it cannot free your computer until less than 64K of text remains to be printed.

A counter, BUF_CNT, keeps track of how many characters are in the buffer. The data in BUF_CNT is redundant (you can derive it from the contents of the two

pointers). Only two BUF_CNT values are of interest: 0000 and FFFF hex. The former tells you that there are no more characters to send while the latter says, "Wait, the buffer is full!"

Before storing a character, Spooli checks to make sure that the buffer is not already full. If it is full, the program loops until the printer takes some data from the buffer and makes room for more. This means that the program hangs here if the printer is off line and the output exceeds 64K of text.

Spooler programs could be made more efficient if there were an interrupt that signaled when the printer was ready to accept another character. The BIOS provides for such an interrupt, but most computers are not wired to use it and require another approach. Spooli uses the timer interrupt.

Eighteen times a second, a clock signal interrupts the computer to update the counters that are keeping the time of day. Spooli intercepts the timer interrupt and steals a few milliseconds to send characters to your printer, using the interrupt 17 hex routine, before jumping to the timer interrupt routine. After it sends each character, Spooli updates Out_PTR and BUF_CNT.

Printing would take forever if Spooli printed only one character each time it called the output routine. To output a reasonable amount of text in one batch, yet keep your computer from getting hung up if your printer goes off line, Spooli loops through the output routine. It counts the passes, whether or not a character is sent, and exits when the count equals the value of the constant Cycles, currently set at 100.

This Cycles value of 100 causes the computer to spend about a third of its time servicing the printer and works well with printers that have only a single-line buffer. If your printer has a larger buffer, you can make the value of Cycles smaller. This permits your computer to spend more time doing other things without slowing down the printer.

Although a spooler should be able to run automatically, you must have external control. Spooli provides a purge command, alternate-P, which empties the buffer and resets the pointers to zero. The program also contains a duplicate command, alternate-D, which lets you make additional copies. You can execute these commands from within programs or from the DOS prompt.

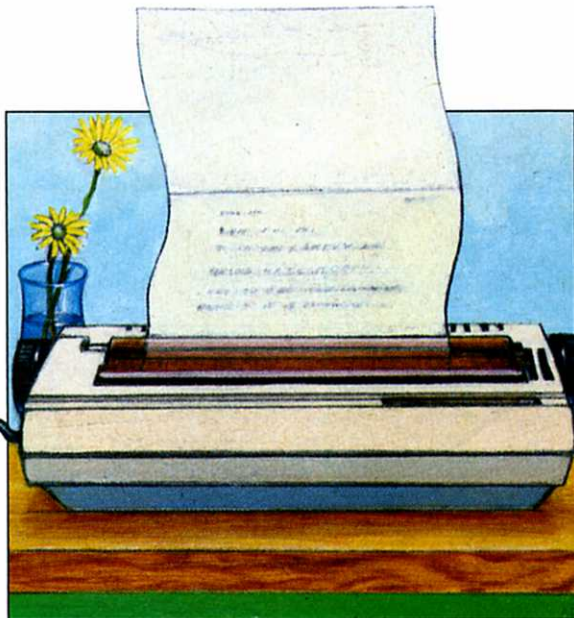
Controlling Spooli

The control routine intercepts the keyboard interrupt, 09 hex, and looks for alternate-P or alternate-D key combinations. When it detects either one, it calls the appropriate routine. If this choice of commands interferes with any of your programs, you can select another combination.

You can use the purge command anytime, but if you do so while your program is printing, the buffer continues to fill. The duplicate command only works on documents that are smaller than 64K for which you executed the purge command before starting your printing job. You can also use the duplicate command to stop and then restart a print operation if the paper becomes jammed or some other calamity occurs.

Easy Restart

You can restart at any time. To begin printing again, simply take your printer



off line, solve the problem, press alternate-D, and put your printer back on line. Make sure your printer is turned on before starting a print operation. Sometimes the computer output port cannot distinguish between a dead line and a ready signal.

Assembling Spooli

Spooli is designed to be assembled and then converted to a COM file. The following commands, which you can place in a batch file, will perform the tasks if you are using the Microsoft macro assembler, MASM.

```
ECHO OFF
MASM %1:
LINK %1:
DEL %1.OBJ
EXE2BIN %1 %1.COM
DEL %1.EXE
```

Name the source file Spooli.ASM, the batch file ASM.BAT, and type ASM SPOOLI to start the process. Ignore the warning message that your computer will display concerning a missing stack sector. ■

David A. Williams is a staff engineer with a major aerospace firm and has 25 years of experience with computers. Write to him at 2452 Chase Circle, Clearwater, FL 33546.

Program Listing. Spooli.

```
; SPOOLER PROGRAM, David Williams

CYCLES EQU 100 ;NUM OF LOOPS THRU OUTPUT ROUTINE

;Data area containing keyboard buffer and status word
BIOS_DATA SEGMENT AT 40H
ORG 1AH
HEAD DW ?
TAIL DW ?
BUFFER DW 15 DUP(?)
BUFF_END DW ?
BIOS_DATA ENDS
CSEG SEGMENT
ASSUME CS:CSEG,ES:CSEG,DS:CSEG
ORG 100H
BEGIN: JMP INIT
;Counters, pointers, and other data
DATA_SEG DW 0 ;BUFFER SEGMENT ADDRESS
OUT_PTR DW 0 ;OUTPUT POINTER
IN_PTR DW 0 ;INPUT POINTER
BUF_CNT DW 0 ;AMOUNT OF DATA IN THE BUFFER
OLD_TIMER DD 0 ;ORIGINAL TIMER INT VECTOR
OLD_KYBD_INT DD 0 ;ORIGINAL KYBD INT VECTOR
PRINT DD 0 ;ORIGINAL PRINTER INT VECTOR
;Routine called by kybd input to purge buffer, duplicate output
CONTROL PROC FAR
ASSUME DS:BIOS_DATA
STI
PUSH BX
PUSH DS
PUSH AX
;Input data from the keyboard and look for control characters
PUSHF
CALL OLD_KYBD_INT
MOV AX, BIOS_DATA
MOV DS, AX
MOV BX, TAIL ;FIND CHARACTER
SUB BX, 2
CMP BX, OFFSET BUFFER
JAE NO_WRAP
MOV BX, OFFSET BUFF_END
NO_WRAP: MOV AX, [BX] ;GET CHARACTER
CMP AX, 2000H ;IS IT ALT-D?
JZ DUPE
```

Listing continued

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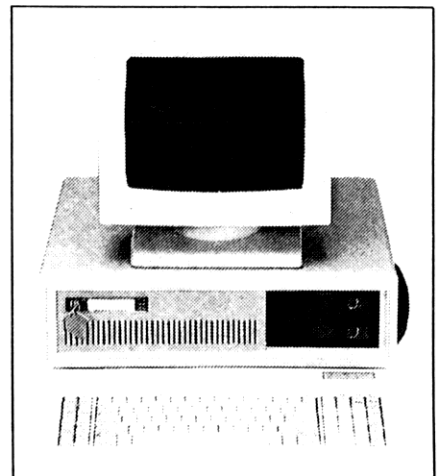
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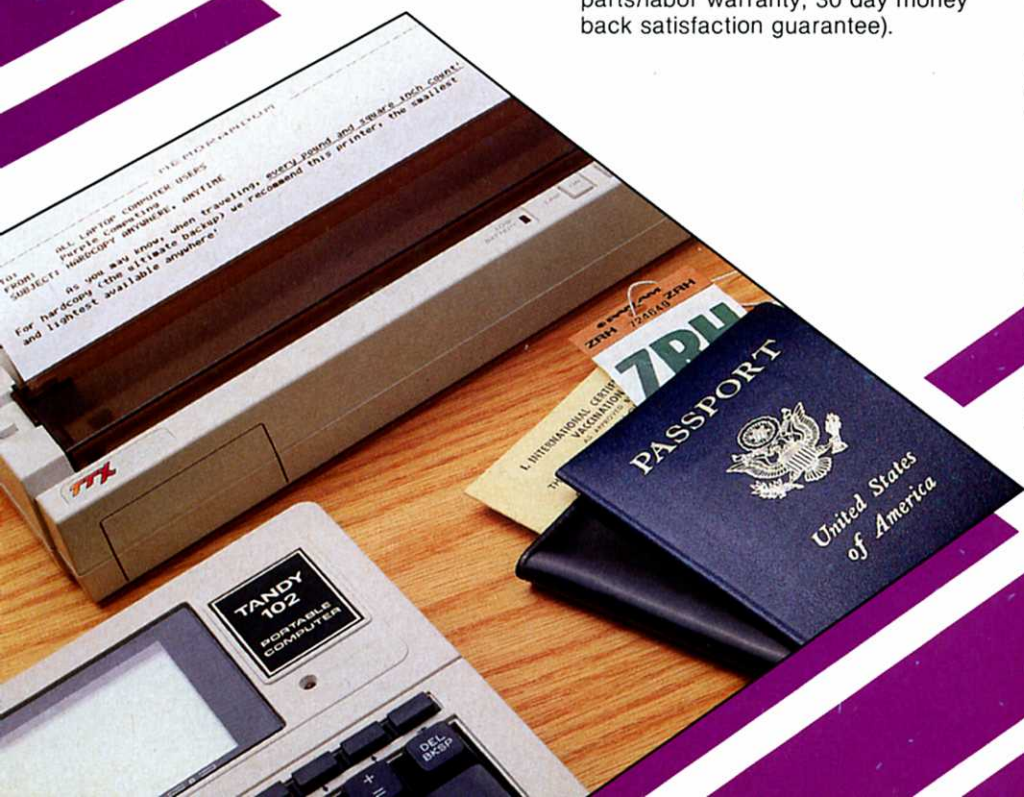
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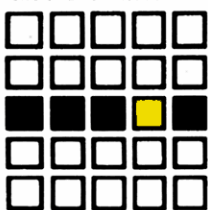
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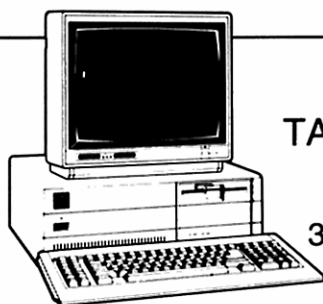
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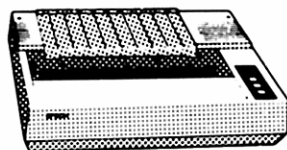
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Using TRS Stamp

TRS Stamp (see the Program Listing) is a Basic routine that runs on the Model 4 and Tandy 1000. It also runs on the Models I/III with changes listed later. It is short and easy to implement. You can modify TRS Stamp to insert information other than the time, but unless that information changes often, there is no real advantage to doing so.

Once you have appended TRS Stamp to the end of your program, insert the time-stamp line at the beginning of the program. To activate TRS Stamp, break out of your program and type GOTO x, where x is the line number at which you appended the routine. Then save your program to disk.

You must run your program to initialize the variable tables before you break out. Typing GOTO x without having done so will not work.

Anatomy of TRS Stamp

Line 1 does not have to be the first line of your program. It is, however, easy to list in Basic, and you can review it from the TRSDOS Ready (or MS-DOS's A>) prompt with the List (or Type) command. You can put the line anywhere you want. You can

call the variable for a "Last updated xx/xx/xx" notice in the program. It is important, however, that the space allowed for the update area match the length of the combined date and time line.

The subroutine only accepts replacement characters up to the length of the dummy string.

The VARPTR call in line 65000 determines the location of the string. The VARPTR points to the actual location of the string in the program line because the variable is a constant. Line 65020 determines the actual address of the string.

Line 65030 sets up the replacement string. You can damage your program by overrunning the length of the dummy string with a too-long replacement string. The subroutine in line 65040, therefore, only accepts replacement characters up to the length of the dummy string. It does this by using the length of string parameter in the VARPTR function.

Line 65050 is perhaps the most confusing. The parameters for Poke and Peek commands are restricted to integers, so they must fall within the -32,767 to 32,767 range. If you require a number

larger than 32,767 for poking or peeking, you must subtract 65,536 from it to get a valid integer.

Line 65060 inserts the replacement line, character by character, into the spaces allocated by the dummy string.

Line 65070 is the For...Next loop closure for line 65040.

Suggestion for Successful Stamping

You can compress TRS Stamp into two or three lines, but unless you are cramped for space, it is simpler to run the routine as is and then delete it at the end of the program-development procedure. You can merge TRS Stamp from disk if the line numbers are suitable and you saved the routine in ASCII format.

TRS Stamp modifies the program to which it is attached. Make certain that the string variable for the date-stamp is unique in that program and save a copy of the program prior to executing TRS Stamp. After executing the routine, list your program on the screen for a quick visual check.

Model I/III Changes

To make TRS Stamp work on the Model I/III, change line 65040 to read:

```
65040 FOR T=1 TO PEEK(C)-1
```

Also, change the DZZ\$ and ADDR\$ variables to two-letter variables. ■

Lionel P. Tercier has been programming in Basic on Tandy computers for several years and is a professional photographer. Write to him at Box 2430, Bonnyville, Alberta, Canada T0A 0L0.

System Requirements

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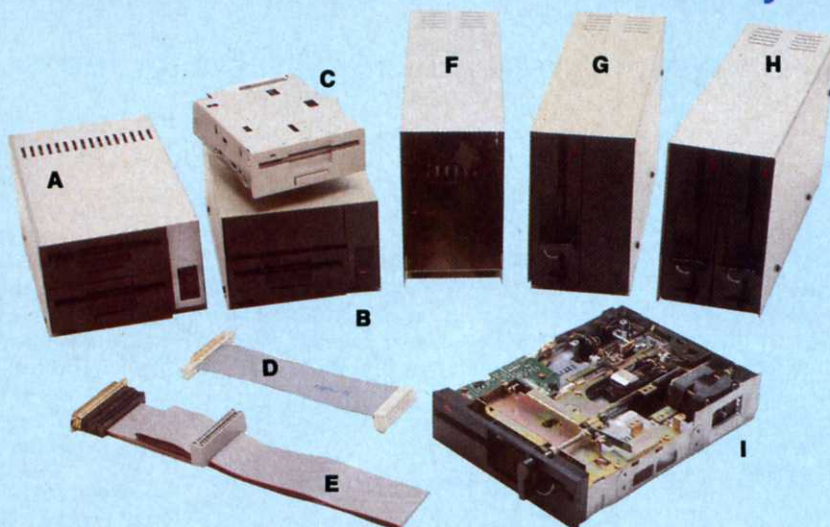
Program Listing. TRS Stamp.

```
1 DZZ$="THIS IS THE UPDATE" ' Make space for dateline          '* 1734
65000 C=VARPTR(DZZ$)                                             '* 1255
65010 ' Determine address of variable
65020 MSB= PEEK(C+2)*256:LSB= PEEK(C+1) : ADDR$ = MSB+LSB      '* 3353
65030 GS=DATE$+" "+TIME$ ' Get current date and time          '* 1333
65040 FOR T=1 TO PEEK(C) ' Length is set by VARPTR              '* 1412
65050 H=(ADDR$+T-1):IF H>32767 THEN H=H-65536                  '* 2667
65060 POKE H,ASC(MID$(GS,T,1)) ' Insert into program line      '* 1763
65070 NEXT T                                                    '* 725
```

End

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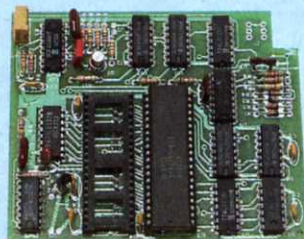
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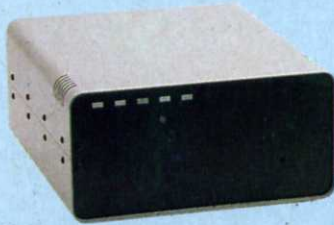


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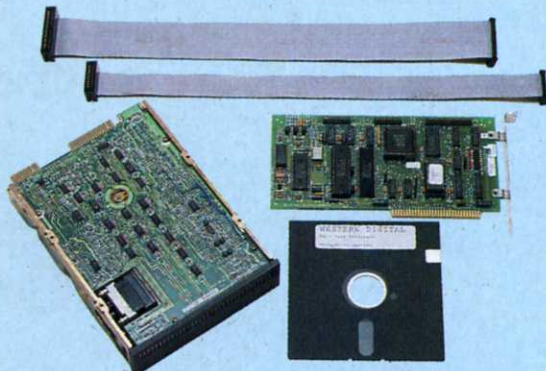
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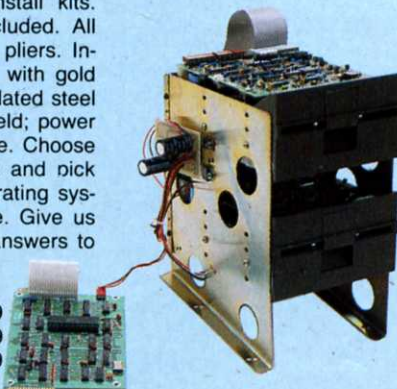


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A Quick Comparison

Display any two Model 4 text files simultaneously and compare them line by line.

In the course of programming, I usually wind up with several versions of the same program. At some point I need to find the precise differences between these versions and make some reason of the rhyme. Reviewing printed copies of the two programs is out of the question. I wrote Compare Plus, a comparing line editor for the Model 4 that lets you look at any two line-oriented text files simultaneously.

Compare Plus does not modify the files. You control the scan as Compare Plus compares identical areas, but the scan stops when a difference is detected. Your comments entered from the keyboard and selected lines from either file are sent to the printer, giving you data for analysis. Compare Plus reads files written in any programming language and saved in ASCII.

I wrote Compare Plus using Misosys's EDAS editor/assembler (see the Program Listing), commenting the program at key points. You can assemble it with EDAS or Pro-Create. Other assemblers might require syntax modifications. In assembled form, Compare Plus is a 1,123-byte (4½-sector) CMD file.

In operation, the first file appears on the top half of the screen, and the second file appears on the bottom of the screen (see Photo). The screen displays nine lines from each. As you tap the spacebar, Compare Plus reads one more line from each file, scrolls up the existing displays, adds the new lines at the bottom of each, and makes a byte-for-byte comparison of these last two lines. Compare Plus scans identical lines from two files at about 800 lines per minute.

As long as the lines are identical, the comparing scan proceeds freely. When there is a difference, the scan stops and you can analyze and record the discrepancy.

To assist this analysis, you can scroll through either file forward or backward.

Since Compare Plus accesses the disk frequently, particularly during the reverse scroll, you will get better performance if you place one or both of the files to be compared on a Memdisk.



Photo. Split screen allows you to compare two files.

Using Compare Plus

Assemble Compare Plus as CED/CMD. You have several ways to invoke Compare Plus, so I'll give some examples. First, suppose you want to compare two EDAS files. No parameters are necessary. At the TRSDOS Ready prompt enter:

```
CED file1/ASM:1 file2/ASM:2
```

If you do not include a drive number, TRSDOS finds the file on the first available drive, and Compare Plus's screen display

shows the drive. If you don't include the filespecs on the command line, Compare Plus prompts you for them.

Compare Plus looks for an end-of-file (EOF) marker to terminate and return to DOS. EDAS and its successors use X'1A' (26 decimal), and this is the default value for Compare Plus. Scripsit and many other editors use 00 hexadecimal (hex) as the EOF marker, and Basic programs saved in ASCII also have a zero EOF.

If in doubt, list the file using the hex parameter and look at the last few bytes. The last line should be terminated by an X'OD' followed by 1 or 2 bytes. The first byte following the last X'OD' is the EOF marker. If your EOF marker is, for example, X'1C', specify it as a parameter when you invoke Compare Plus:

```
CED file1/SRC:1 file2/SRC:2 (EOF = X'1C') or  
(EOF = 28)
```

EDAS can save a file with or without line numbers. With an EDAS line-numbered file, Compare Plus uses those line numbers, otherwise Compare Plus generates line numbers starting with 100, incrementing by 10. When the file contains line numbers, Compare Plus displays a pound (#) sign in front of the filespec. Compare Plus works even if one file is numbered and the other is not. The byte-for-byte comparison only involves the actual text of the line, since the line numbers have no effect in assembly.

To compare two versions of a Basic pro-

System Requirements

Model 4

64K RAM

Editor/assembler

Printer optional

Available on The Disk Series

Key	Label	Function
spacebar	NEXT	Read one line from each file and compare
S or s	SCAN	Toggle automatic scan on and off
		When scan is on comparison is done
1	LN1	Last line for file 1 to printer (comparison)
2	LN2	Last line for file 2 to printer (comparison)
C or c	COMNT	Enter a comment from the keyboard and send to the printer (comparison)
break	EXIT	Exit to DOS
up arrow	ADV1	Advance file 1 by one line (no comparison)
down arrow	ADV2	Advance file 2 by one line (no comparison)
clear-up arrow	REV1	Reverse file 1 by one line (no comparison)
clear-down arrow	REV2	Reverse file 2 by one line (no comparison)

Table. Compare Plus Commands.

gram, you must save both in ASCII and specify Compare Plus's Basic parameter, which you can abbreviate:

CED file1/BAS:1 file2/BAS:2 (B)

Specifying this parameter suppresses Compare Plus's automatic line numbering and sets the EOF marker to zero. Fur-

You can use the B parameter on any file to avoid automatic line numbering.

thermore, the byte-for-byte comparison now includes the line numbers.

Compare Plus will not display or compare text past its 80-character-per-line limit. Be aware of this restriction when comparing Basic files.

You can use the B parameter on any file to avoid the automatic line numbering. Note also that the EOF parameter overrides the zero associated with the Basic parameter. Thus:

CED file1/txt:1 file2/txt:2 (B,EOF=26)

suppresses the line numbers but still looks for an EOF marker of X'1A'.

Compare Plus also keeps a line count for each file and displays these numbers to the right of each filespec. The line count refers to the last-read line and decreases as the file is reversed.

Command Details

Once Compare Plus has the two files, you have 10 commands at your disposal (see the Table). The most important is the "next" command, which advances both files by one line. You can rapidly review long, identical sections by holding down the spacebar. If you want more careful visual review, tap the spacebar for single-line advance.

For the most rapid comparison, use the scan command, which supplies a X'20' (spacebar) character automatically after each line comparison. The scan stops when Compare Plus finds a difference in the two files. When scan is in effect, an S displays in the middle line to the right of the line count. The S key toggles the scan function on and off.

When Compare Plus detects a difference in the two files, the scan stops (the spacebar is inoperative), and a blinking asterisk appears in the center of the screen. Review the lines that differ and take whatever action is indicated. You can access all nine of the other commands at this point or exit the hold by pressing any other key.

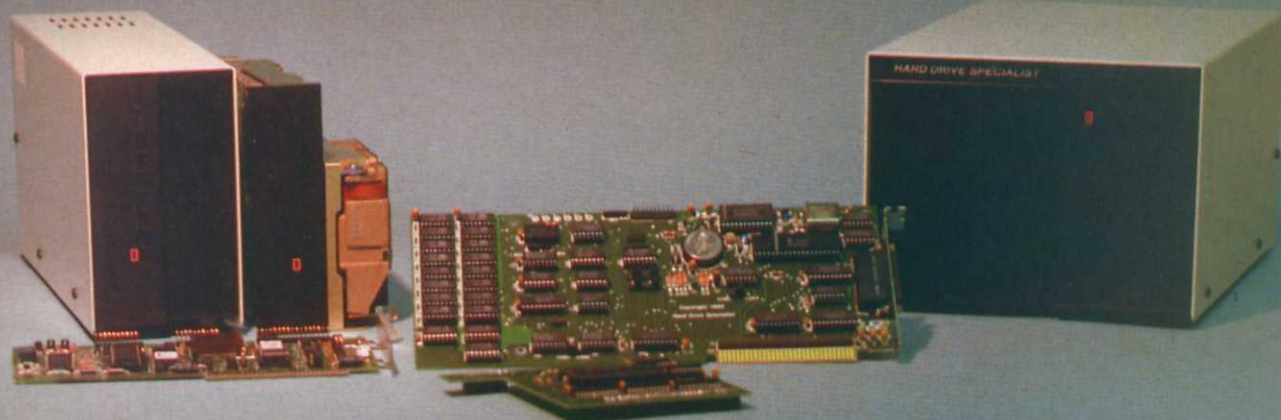
As noted in the Table, you control in-

Program Listing. Compare Plus.

```
00100      TITLE      '<CED - Comparing line editor>'
00110      ;for Model 4 with TRSDOS 6.2
00120      ;by James L. Hawes
00130      @KEY      EQU      1
00140      @DSP      EQU      2
00150      @KEYIN    EQU      9
00160      @DSPLY    EQU      10
00170      @PRINT    EQU      14
00180      @VDCTL    EQU      15
00190      @PARAM    EQU      17
00200      @EXIT      EQU      22
00210      @ERROR    EQU      26
00220      @OPEN     EQU      59
00230      @READ     EQU      67
00240      @FSPEC    EQU      78
00250      SVC       MACRO    #SVC
00260      LD         A,#SVC
00270      RST        28H
00280      ENDM
00290      ORG        2700H
00300      PTAB       DB        80H      ;begin parameter table
00310      DB          55H      ;demand flag entry
00320      DB          'BASIC'  ;default is off
00330      DB          0        ;suppress line numbers
00340      DW          BASIC+1   ;and set EOFM to 00
00350      DB          83H      ;demand numeric entry
00360      DB          'EOF'     ;to set EOFM
00370      DB          0        ;default is 1AH
00380      DW          EOF+1
00390      DB          0
00400      ENTRY      PUSH      HL        ;search for possible
00410      LD          A,(HL)            ;parameters first
00420      INC         HL
00430      CP          0DH
00440      JR          Z,NPARAM
00450      CP          '('
00460      JR          NZ,ENTRY+1
00470      DEC         HL
00480      LD          DE,PTAB
00490      SVC         @PARAM
00500      JP          NZ,ERROR
00510      NPARAM     LD          HL,SCRNB ;blank out screen buffer
00520      LD          DE,SCRNB+1 ;from 2C00 to 337F
00530      LD          BC,77FH
00540      LDIR
00550      POP         HL                ;recover command line
00560      LD          A,(HL)            ;and look for filespec 1
00570      CP          40H
00580      CALL        C,ENFIL1         ;none given so request it
00590      LD          DE,MSGFS1        ;move filespec to screen
00600      PUSH        HL                ;and on return HL will
00610      CALL        MOVFN            ;point to ':'
00620      LD          (DRV1),HL         ;save till drv # known
00630      POP         HL
00640      LD          DE,FCB1            ;open file 1 with
00650      SVC         @FSPEC            ;input buffer 2600
00660      LD          A,13H             ;to 26FF
00670      JR          NZ,ERJP
00680      PUSH        HL                ;save command line
00690      LD          B,0
00700      LD          HL,2600H
00710      SVC         @OPEN
00720      JR          NZ,ERJP
00730      LD          A,(FCB1+6)        ;get drive # found
00740      ADD         A,30H
00750      LD          HL,0
00760      DRV1       EQU          $-2   ;HL => ':' if present
00770      LD          (HL),':'           ;if drive # was entered
00780      INC         HL                ;on command line, this
00790      LD          (HL),A             ;simply overwrites
00800      INC         HL                ;with identical info
00810      LD          (HL),20H
00820      PUSH        DE
00830      POP         IX                ;IX => FCB1
00840      POP         HL                ;remaining command line
00850      LD          A,(HL)
00860      CP          40H
00870      CALL        C,ENFIL2         ;similar to file 1
00880      LD          DE,MSGFS2
00890      PUSH        HL
00900      CALL        MOVFN
00910      LD          (DRV2),HL
00920      POP         HL
00930      LD          DE,FCB2            ;open file 2 with
00940      SVC         @FSPEC            ;input buffer 2700
00950      LD          A,13H             ;to 27FF
00960      JR          NZ,ERJP
00970      LD          B,0
00980      LD          HL,2700H
00990      SVC         @OPEN
01000      ERJP      JP          NZ,ERROR
01010      LD          A,(FCB2+6)
01020      ADD         A,30H
01030      LD          HL,0
01040      DRV2       EQU          $-2   ;HL => ':'
01050      LD          (HL),':'           ;if drive # was entered
01060      INC         HL                ;on command line, this
01070      LD          (HL),A             ;simply overwrites
01080      INC         HL                ;with identical info
01090      LD          (HL),20H
01100      PUSH        DE
```

Listing continued

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dividual advance of the files with the up- and down-arrow keys. To get the reverse scroll, hold the clear key and tap the appropriate arrow key. Do not reverse-read a file to its first line, because this locks up Compare Plus on sector zero, and you must press break to exit.

The four individual scroll commands return to the command key without any comparison. This allows unhindered search. Upon return from the other four commands, next, print 1, print 2, and comment, Compare Plus again compares the last two lines, and the blinking asterisk appears if they differ. If you wish to avoid the repeated comparison and resulting hold following the two-line prints and the comment, increase the value in line 3640 from six to 10.

Compare Plus displays a blinking asterisk if the last two lines differ.

If the difference appears to be a minor change to a single line, you might want to record the two lines. Pressing the 1 key sends the last line from the top file to the printer and the 2 key sends the last line from the bottom file. Compare Plus labels these printed lines as either "File 1" or "File 2."

Reverse Scrolls

Compare Plus performs the reverse scrolls by searching through the files for the beginning of the 10th line preceding the current line. It then reads nine lines and scrolls upwards. All of this action is carried out on a mapped buffer, and only the final result appears on the video. If Compare Plus displays lines 250-330, reversing once displays lines 240-320. This is done without any confusing movement and repeats it at a respectable 280 lines per minute.

Frequently, the difference between the files is due to added lines. When this happens, you can scroll forward and in reverse through each file separately as needed. You might want to send several lines to the printer and make one or more comments to your printout. As you type a comment line, it appears on the bottom line of the screen. Press enter to terminate a comment. The left-arrow key is a backspace. The comment line is limited to 79 characters plus the enter key, but you can use as many lines as you need.

Use the individual scrolls to get the two

files back into sync. Individual scrolling can easily handle situations such as a group of lines moved from one area of the program to another, or two different files containing the same sizable subroutine, where you want to see whether two routines are identical.

I have written an LDOS 5.x Model III version of Compare Plus. Unfortunately,

space is too limited to publish it here. It is available, however, on The 80 Micro Disk Series. See p. 6 for details. ■

James L. Hawes has done extensive amateur programming for several years. Send your questions and comments to him at 1781 Lafreniere St., New Orleans, LA 70122.

Listing continued

```

01110      POP      IY          ;IY => FCB2
01120      LD       C,14
01130      SVC      @DSP          ;turn on cursor
01140      JP       START        ;get above 27FF to use buffers
01150 MOVFN  SVC      @FSPEC
01160      LD       H,D
01170      LD       L,E
01180 MOV1  INC      HL
01190      LD       A,(HL)
01200      CP       3
01210      RET      Z          ;if find 03, no drive given
01220      CP       ' '
01230      RET      Z
01240      JR       MOV1
01250 ENFIL2 LD      HL,TWO      ;HL=>prompt message
01260      LD       BC,MSGFS2     ;BC=>where to put it
01270      JR       ENFIL3
01280 ENFIL1 LD      HL,ONE
01290      LD       BC,MSGFS1
01300 ENFIL3 SVC      @DSPLY
01310      LD       H,B
01320      LD       L,C
01330      LD       BC,1F00H
01340      SVC      @KEYIN
01350      JP       C,EXIT      ;<BRK> causes exit
01360      RET
01370 FCB1  EQU      2800H
01380 FCB2  EQU      2820H
01390      ORG      2840H
01400 ERROR OR       40H        ;error causes exit
01410      LD       C,A
01420      SVC      @ERROR
01430 EXIT  LD       BC,85FH     ;replace cursor with
01440      SVC      @VDCTL        ;underline
01450      LD       HL,0
01460      SVC      @EXIT
01470 DECNUM PUSH    DE
01480      LD       DE,DECTAB
01490 DEC1  LD       A,(DE)
01500      LD       C,A
01510      INC      DE
01520      LD       A,(DE)
01530      LD       B,A
01540      INC      DE
01550      PUSH    DE
01560      LD       A,0AFH
01570 DEC2  INC      A
01580      LD       D,H
01590      LD       E,L
01600      ADD     HL,BC
01610      JR       C,DEC2
01620      POP     HL
01630      EX      (SP),HL
01640      EX      DE,HL
01650      CALL    DSP
01660      EX      DE,HL
01670      EX      (SP),HL
01680      EX      DE,HL
01690      INC     C
01700      JR       NZ,DEC1
01710      POP     DE
01720      LD       A,20H
01730      JP       DSP
01740 DECTAB DW      -10000
01750      DW      -1000
01760      DW      -100
01770      DW      -10
01780      DW      -1
01790 DSP   CP       9
01800      JR       Z,DTAB
01810      AND     7FH          ;strip bit 7
01820 DSP1  LD       (DE),A
01830      INC     DE
01840      PUSH    DE          ;check for end of line
01850      PUSH    HL
01860      EX      DE,HL
01870      LD       DE,-SCRNB     ;subtract beginning
01880      ADD     HL,DE          ;of screen buffer
01890      LD       DE,50H
01900      XOR     A
01910      SBC     HL,DE
01920      JR       NC,$-2
01930      ADD     HL,DE          ;HL = position in line
01940      LD       A,H
01950      OR      L          ;zero if end of line
01960      POP     HL
01970      POP     DE
01980      RET

```

Listing continued

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```

01990 DTAB LD A,20H
02000 CALL DSPL
02010 RET Z
02020 LD A,E ;tab to positions
02030 ADD A,2 ;(8-2)+8*n
02040 AND 7
02050 JR NZ,DTAB
02060 LD A,D
02070 OR E
02080 RET
02090 READ1 PUSH DE
02100 LD DE,FCB1
02110 LD (IX+10),A ;position NRN
02120 RD1 SVC @READ
02130 POP DE
02140 RET
02150 READ2 PUSH DE
02160 LD DE,FCB2
02170 LD (IX+10),A
02180 JR RD1
02190 LD A,D ;if DE < 3000 must be file 1
02200 CP 30H
02210 JR NC,GET2
02220 GET1 LD HL,2600H ;current buffer position
02230 BPOS1 EQU S-2
02240 LD A,(HL)
02250 INC L
02260 LD (BPOS1),HL ;update position
02270 JR NZ,GETRN+1
02280 PUSH AF ;if L is 00 need next sector
02290 LD A,(IX+10)
02300 CALL READ1 ;read next sector
02310 JR GETRN
02320 LD HL,2700H
02330 BPOS2 EQU S-2
02340 LD A,(HL)
02350 INC L
02360 LD (BPOS2),HL
02370 JR NZ,GETRN+1
02380 PUSH AF
02390 LD A,(IX+10)
02400 CALL READ2
02410 GETRN POP AF ;recover input byte
02420 CP 1AH ;default end of file for EDAS
02430 EOFM EQU S-1 ;changed to 00 if BASIC
02440 JP Z,EXIT ;or as desired by EOF param
02450 RET
02460 BACK1 LD HL,(BPOS1)
02470 DEC L
02480 LD (BPOS1),HL ;decrease buffer position
02490 LD A,L ;when L goes from 00 to FF
02500 INC A ;must get prior sector
02510 JR NZ,BK11
02520 LD A,(IX+10)
02530 DEC A ;must decrease by 2
02540 DEC A ;to get prior sector
02550 CALL READ1
02560 BK11 LD A,(HL) ;get prior byte
02570 RET
02580 BACK2 LD HL,(BPOS2)
02590 DEC L
02600 LD (BPOS2),HL
02610 LD A,L
02620 INC A
02630 JR NZ,BK21
02640 LD A,(IX+10)
02650 DEC A
02660 DEC A
02670 CALL READ2
02680 BK21 LD A,(HL)
02690 RET
02700 START XOR A
02710 CALL READ1 ;read first sector
02720 LD A,(2600H) ;checking bit 7 of
02730 RLCA ;first byte
02740 CCF
02750 SBC A,A
02760 LD (NQ1),A ;A = 0 if EDAS line numbered
02770 JR NZ,STR1 ;else A = FF
02780 LD A,'#' ;'#' indicates line
02790 LD (SCRNB+0),A ;numbers from file
02800 STR1 XOR A
02810 CALL READ2
02820 LD A,(2700H) ;check file 2
02830 RLCA
02840 CCF
02850 SBC A,A
02860 LD (NQ2),A
02870 JR NZ,BASIC
02880 LD A,'#'
02890 LD (SCRNB+3C0H),A
02900 BASIC LD BC,0
02910 LD A,B
02920 OR C
02930 JR Z,EOF
02940 XOR A ;suppress line numbering
02950 LD (NQ1),A
02960 LD (NQ2),A
02970 LD (COMP+1),A
02980 LD (EOFM),A ;end of file is 00
02990 EOF LD BC,-1
03000 LD A,C ;if both BASIC and EOF are given

03010 INC C ;the value of EOF will override
03020 JR Z,DSCRN ;the default value of
03030 LD (EOFM),A ;EOFM is 1AH or 26 dec
03040 JR DSCRN ;provide 80 byte buffer
03050 ORG START+50H ;for comment line
03060 DSCRN JR $+2 ;provide for jump to GETKS
03070 LD B,5 ;during auto reverse
03080 LD HL,SCRNB
03090 SVC @VDCTL ;display screen buffer
03100 LD B,3
03110 LD HL,0C1BH ;position blinking cursor
03120 SVC @VDCTL ;in middle of screen
03130 LD BC,820H ;make sure cursor
03140 SVC @VDCTL ;character is 20H
03150 SWCH JR GETKS ;allow jump over compare routine
03160 ;for single file commands (ADV1, ADV2, REV1, & REV2
03170 ;set SWCH+1 = 00 so that compare is done for
03180 ;NEXT, COMNT, & line prints (LN1 & LN2)
03190 COMP LD B,6 ;00 if BASIC param used
03200 LD A,B
03210 LD DE,SCRNB+320H ;DE => last line file 1
03220 ADD A,E
03230 LD E,A
03240 LD A,B
03250 LD HL,SCRNB+6E0H ;HL => last line file 2
03260 ADD A,L
03270 LD L,A
03280 LD A,80 ;80 characters per line
03290 SUB B ;don't compare EDAS line numbers
03300 LD B,A
03310 CLP LD A,(DE)
03320 CP (HL)
03330 JR NZ,DIF
03340 INC HL
03350 INC DE
03360 DJNZ CLP
03370 LD A,20H ;simulate <space bar>
03380 S_SWCH JR GETKS ;jump to GETKS+3 if SCAN is ON
03390 DIF LD BC,82AH ;change cursor to '*'
03400 SVC @VDCTL
03410 SVC @KEY
03420 CP 20H
03430 JR Z,DIF
03440 PUSH AF ;save this key stroke
03450 LD BC,820H ;change cursor to blank
03460 SVC @VDCTL
03470 POP AF ;recover key stroke
03480 JR $+5
03490 GETKS CALL KEY ;need a call instead of SVC here
03500 LD HL,TABL ;for AUTO to work
03510 LD B,12
03520 CP (HL)
03530 INC HL
03540 LD E,(HL)
03550 INC HL
03560 LD D,(HL) ;DE => command entry
03570 INC HL
03580 JR Z,FOUND ;jump if right
03590 DJNZ SRCH
03600 JR GETKS ;key pressed was not a command
03610 FOUND LD HL,SWCH+1
03620 LD (HL),0 ;do compare if command is first 5
03630 LD A,B ;NEXT, SCAN, LN1, LN2, COMNT
03640 CP 6 ;jump over compare for last 4
03650 JR NC,$+4 ;ADV1, ADV2, REV1, REV2
03660 LD (HL),GETKS-SWCH-2
03670 LD HL,DSCRN
03680 PUSH HL ;return address
03690 PUSH DE ;command address
03700 RET
03710 KEY SVC @KEY
03720 RET
03730 TABL DB 20H
03740 DW NEXT
03750 DB 'S'
03760 DW SCAN
03770 DB 's'
03780 DW SCAN
03790 DB '1'
03800 DW LN1
03810 DB '2'
03820 DW LN2
03830 DB 'C'
03840 DW COMNT
03850 DB 'c'
03860 DW COMNT
03870 DB 80H
03880 DW EXIT
03890 DB 0BH ;up arrow
03900 DW ADV1
03910 DB 0AH ;down arrow
03920 DW ADV2
03930 DB 0BH ;clr up arrow
03940 DW REV1
03950 DB 8AH ;clr down arrow
03960 DW REV2
03970 LD HL,S_SWCH+1
03980 SCAN LD A,GETKS-S_SWCH-2 ;jump to GETKS
03990 LD C,20H ;to blank out "S"
04000 CP (HL) ;compare to current value
04010 JR NZ,SCAN1 ;and toggle to the other
04020 LD A,GETKS-S_SWCH+1 ;jump to GETKS+3

```

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Listing continued

```

04030 ;avoid the keyboard input at GETKS and force auto NEXT
04040 LD C,'S'
04050 SCAN1 LD (HL),A ;alter jump at S_SWCH
04060 LD HL,SCRNB+3F0H
04070 LD (HL),C ;put "S" or blank on screen
04080 RET
04090 NEXT LD B,0AFH ;if A is non zero both files
04100 ADV1 EQU $-1 ;will advance
04110 PUSH AF
04120 LD DE,SCRNB+0A0H ;scroll eight lines
04130 LD HL,SCRNB+0F0H
04140 LD BC,280H
04150 LDIR ;DE = SCRNB+320H = begin line 9
04160 CALL GET ;this makes LDNL loop easier
04170 EX AF,AF' ;save first byte
04180 LD A,0
04190 NQ1 EQU $-1
04200 OR A ;generate line numbers from
04210 CALL NZ,LNUMB1 ;100 by 10's
04220 CALL LDNL ;load and display one line
04230 LD HL,0
04240 LNCNT1 EQU $-2 ;real line counter
04250 INC HL
04260 LD (LNCNT1),HL
04270 LD DE,SCRNB+20H
04280 CALL DECNUM
04290 POP AF
04300 OR A
04310 RET Z ;return if command was ADV1
04320 ADV2 LD DE,SCRNB+460H
04330 LD HL,SCRNB+4B0H
04340 LD BC,280H
04350 LDIR ;DE = SCRNB+6E0H = begin line 9
04360 CALL GET
04370 EX AF,AF'
04380 LD A,0
04390 NQ2 EQU $-1
04400 OR A
04410 CALL NZ,LNUMB2
04420 CALL LDNL
04430 LD HL,0
04440 LNCNT2 EQU $-2
04450 INC HL
04460 LD (LNCNT2),HL
04470 LD DE,SCRNB+3E0H
04480 CALL DECNUM
04490 RET
04500 LDNL EX AF,AF' ;recover first byte
04510 CP 0DH ;check for empty line
04520 JR Z,LDLN2
04530 LDNL1 CALL DSP
04540 JR Z,WASTE ;Z if more than 80 characters
04550 CALL GET
04560 CP 0DH ;end of line
04570 JR Z,ERAS
04580 JR LDNL1
04590 LDNL2 LD A,88H ;block graphic character
04600 LD (DE),A
04610 INC DE
04620 ERAS LD A,20H ;erase to end of line
04630 CALL DSP
04640 RET Z
04650 JR ERAS
04660 WASTE CALL GET ;just read to next 0DH
04670 CP 0DH
04680 JR NZ,WASTE
04690 RET
04700 LNUMB1 LD BC,10 ;generate EDAS type line
04710 LD HL,90 ;numbers from 100 by 10's
04720 LNMB1 EQU $-2
04730 ADD HL,BC
04740 LD (LNMB1),HL
04750 JP DECNUM
04760 LNMB2 LD BC,10
04770 LD HL,90
04780 LNMB2 EQU $-2
04790 ADD HL,BC
04800 LD (LNMB2),HL
04810 JP DECNUM
04820 REV1 CALL BACK1 ;go back one byte (0DH)
04830 LD B,10 ;go back 10 lines
04840 RV11 CALL BACK1
04850 CP 0DH ;look for end of line
04860 JR NZ,RV11
04870 LD HL,(LNCNT1)
04880 DEC HL ;decrease real line numb
04890 LD (LNCNT1),HL
04900 LD DE,-10
04910 LD HL,(LNMB1) ;decrease generated
04920 ADD HL,DE ;line number
04930 LD (LNMB1),HL
04940 DJNZ RV11 ;loop for 10 lines
04950 CALL GET1 ;get into forward gear again
04960 LD A,0BH ;key stroke for ADV1
04970 JR APREP
04980 REV2 CALL BACK2
04990 LD B,10
05000 RV21 CALL BACK2
05010 CP 0DH
05020 JR NZ,RV21
05030 LD HL,(LNCNT2)
05040 DEC HL
05050 LD (LNCNT2),HL

05060 LD DE,-10
05070 LD HL,(LNMB2)
05080 ADD HL,DE
05090 LD (LNMB2),HL
05100 DJNZ RV21
05110 CALL GET2
05120 LD A,0AH ;key stroke for ADV2
05130 APREP LD HL,AUTO
05140 LD (HL),9 ;advance 9 lines
05150 INC HL
05160 LD (GETKS+1),HL ;call AUTO instead of KEY
05170 INC HL
05180 LD (HL),A ;pass proper key stroke to AUTO
05190 LD HL,DSCRN+1 ;jump over display
05200 LD (HL),GETKS-DSCRN-2 ;to keep screen
05210 RET ;from flashing while 9 lines are read
05220 AUTO DB 0 ;counter
05230 LD A,0 ;contains key for ADV1 or ADV2
05240 LD HL,AUTO
05250 DEC (HL) ;decrease count
05260 JR Z,DUN
05270 RET
05280 DUN LD HL,KEY ;replace call to KEY
05290 LD (GETKS+1),HL
05300 XOR A
05310 LD HL,DSCRN+1 ;remove jump
05320 LD (HL),A
05330 LD A,(AUTO+2) ;advance last of 9 lines
05340 RET
05350 CBKS LD B,4
05360 LD HL
05370 SVC @VDCTL ;get current cursor posn
05380 LD A,L ;look at column
05390 POP HL
05400 OR A ;don't backspace
05410 JR Z,CINPT ;passed beginning of line
05420 LD C,8
05430 SVC @DSP
05440 DEC HL
05450 JR CINPT
05460 COMNT LD B,3
05470 LD HL,1700H ;move cursor to begin
05480 SVC @VDCTL ;of line 23
05490 LD BC,85FH ;and change it to
05500 SVC @VDCTL ;underscore
05510 LD HL,START
05520 PUSH HL ;save for @PRINT
05530 LD B,4FH ;79 characters
05540 CINPT SVC @KEY
05550 CP 8
05560 JR Z,CBKS
05570 CP 0DH
05580 JR Z,CDUN
05590 CP 20H ;ASCII range
05600 JR C,CINPT
05610 CP 80H
05620 JR NC,CINPT
05630 LD (HL),A
05640 INC HL
05650 LD C,A
05660 SVC @DSP
05670 DJNZ CINPT
05680 CTRM SVC @KEY ;80th character must be 0DH
05690 CP 0DH
05700 JR NZ,CTRM
05710 CDUN LD (HL),A ;an 0DH
05720 POP HL ;recover START
05730 SVC @PRINT ;send line to PRINTER
05740 RET
05750 LN1 LD HL,SCRNB+320H ;begin last line file 1
05760 JR $+5
05770 LN2 LD HL,SCRNB+6E0H ;begin last line file 2
05780 PUSH HL ;save for second @PRINT
05790 LD DE,50H
05800 ADD HL,DE ;get end of line
05810 LSRCH DEC HL
05820 LD A,(HL)
05830 CP 20H ;ignore all trailing spaces
05840 JR Z,LSRCH
05850 INC HL
05860 LD (HL),0DH ;mark end line with 0DH
05870 EX (SP),HL ;save the spot to stack
05880 PUSH HL ;replace begin spot
05890 LD A,H
05900 CP 2FH
05910 LD HL,TWO
05920 JR NZ,$+5 ;NZ means it was 32H and want TWO
05930 LD HL,ONE
05940 SVC @PRINT ;print file ID message
05950 POP HL ;recover beginning of line
05960 SVC @PRINT ;print line
05970 POP HL ;recover end spot and
05980 LD (HL),20H ;remove the 0DH
05990 RET ;before screen display
06000 ONE DB 'File 1 ',3
06010 TWO DB 'File 2 ',3
06020 BOT EQU $
06030 ORG 2C00H
06040 SCRNB DB 20H
06050 MSGFS1 EQU SCRNB+2 ;where to put filespecs
06060 MSGFS2 EQU SCRNB+3C2H ;on screen display
06070 END ENTRY

```

End

Can we talk? CP/M vs TRSDOS

By moving to CP/M on your Model 4 you achieve two things. First you open the door to a wealth of existing software. More 8-bit software runs under CP/M than any other operating system. This includes virtually all of the "big name" programs which have set the standards by which all others are measured. Programs like **WordStar**, **dBASE II**, and **Turbo Pascal** are available for CP/M, but not TRSDOS. Public domain software, almost unknown under TRSDOS, fills hundreds of megabytes of disk space. Valuable public domain programs like the **Small C Compiler** are just a toll-free phone call away. Most importantly, hundreds of applications programs are available from a multitude of vendors. Many include the source code. Wouldn't you like to be able to choose from scores of Accounts Receivable or General Ledger programs, instead of the meager selection you now have? Circle our special Reader Service number 600 on the Reader Service Card to receive our comprehensive free listing of suppliers of application programs that run under CP/M.

What about the future?

When the time comes to move up to another computer it will almost certainly use MS-DOS. That's when CP/M users get a pleasant surprise. Since MS-DOS was a derivative of CP/M it operates in almost the same manner. Even better, most of the same software packages are available in 16-bit form and they operate in virtually the same way that they did under CP/M.

Is it easy to use?

Montezuma Micro's CP/M has been carefully crafted to present a maximum of features while taking a minimum of memory. It supports all of the standard features of the Model 4/4P/4D computers, as well as most of the optional ones. Our CP/M has been consistently been awarded the highest ratings in industry magazines. It is version 2.2, the most popular and reliable of all the versions of CP/M produced. Our CP/M has been made as easy to use as possible. All customer-selected features are chosen from simple menus in our CONFIG utility. This includes the ability to configure a disk drive to run like that of scores of other CP/M com-

puters for maximum ease of software portability. Using the unique DBLCROSS program in our Monte's Toolkit utility package you can move files back and forth between CP/M, TRSDOS (1.3 and 6.x), and MS-DOS.

Why use Montezuma CP/M?

We have already told you why our CP/M is the best for the Radio Shack Model 4 computer. The only question left to answer is "Why buy CP/M at all?" Radio Shack has abandoned TRSDOS — all of their new machines use MS-DOS. Most of the software producers have followed, leaving no new software development and saddling the TRSDOS user with whatever software "left-overs" he can find. Which DOS do you want to head into the future with: the one originally written for the Model I or the one that served as the basis for MS-DOS? Make the right choice right now for just \$169.

If I need support?

We don't forget you after the sale. If you have a problem you will find our phones are answered by people, not answering machines or hold buttons. Our philosophy is very simple — we want you to be happy and satisfied with your purchase. If you have a problem then we have a problem, and we'll do whatever we can to resolve it.

Cost to update?

Our owners are protected against instant obsolescence by our lifetime upgrade policy. At any time you can return your original CP/M disk to be upgraded to the latest version free of charge, except for a small shipping and handling fee. Periodically we publish **NEW STUFF**, a newsletter for registered users of Montezuma Micro CP/M. This publication carries news about new products, tips for getting more out of CP/M, and other valuable information for our users. It is sent free of charge to registered owners.

Can I use a hard disk drive?

CP/M hard disk drivers are available for Radio Shack, Aerocomp, and most other popular brands of hard disk drives. These drivers allow the hard drive to be partitioned into one to four logical drives of varying sizes.

These drives may all be used by CP/M, or may be divided between CP/M and TRSDOS. A head-parking utility is included on the driver disk to minimize the risk of damage when the hard disk drive is not in use. Also included at no charge is a utility which will copy, compress, list, print, and delete files with ease. There isn't much you can say about a driver. It either works or it doesn't. Ours works supremely and it only costs \$30.

Hard disk backup?

Unlike the high-priced, underpowered backup utilities available for backup of TRSDOS hard drives, our CP/M **HARDBACK** utility makes the backup of a hard disk to floppies quick and painless. Only **HARDBACK** gives you the choice of backing up the entire drive or only those files which it knows have been changed since the last backup. Daily backup is no longer a chore, since only new data must be copied. With **HARDBACK** you can quickly restore an entire drive, or only a single file if necessary. Only **HARDBACK** will perform a complete check of the hard disk drive and lock out tracks which have become flawed to prevent the use of those tracks for later data storage. Add this supreme program to your hard disk for just \$49. Isn't your time and data worth it?

Specs?

Size of Transient Program Area (TPA): 56,070 bytes in a 64k system. 55,046 bytes in a 63k system (with optional hard disk driver). **CP/M IOBYTE:** Fully implemented. **Device Drivers:** Disk (35, 40, 77, & 80 track, single/double density single/double sided, 3, 5, or 8 inch. (More than 85 disk formats supported) **Maximum Disk Capacity:** 40T SS=220k, 40T DS=440k, 80T DS=880k **RS-232:** All word lengths, parity, & baud rates. **Parallel Printer:** With or without line-feed and/or formfeed. **Video:** 24 by 80 with reverse video. **Keyboard:** Full ASCII with 9 function keys. **RAM Disk:** 64k, automatic on 128k systems. **Hard Disk:** Optional drivers available at extra cost for most popular models. **Standard CP/M programs included:** ASM, DDT, DUMP, ED, LOAD, MOVCPM, PIP, STAT, SUBMIT, SYSGEN, and XSUB.

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Data-Statement Generator

Convert assembly code to Basic Data statements with checksums.

Converting assembly-language source code to Basic Data statements has its advantages. For instance, you can use converted assembly routines within Basic programs, or you can share your assembly code with programmers who don't own an editor/assembler.

My program, Datapoke, reads a CMD file and writes a Basic program. This Basic program contains the CMD file code in Data statements (in decimal format). It also contains the code to read the Data statements, verify each line with checksums and write a CMD file, using the same file name as the original CMD file.

How It Works

Datapoke differs from similar utilities in that it does not go past the actual end of file within the last record of the source file, and it builds a checksum value for each line of data. When the new program runs, it processes each Data Statement and checks its sum against the final value at the end of the line (the value with the minus-sign (-) flag preceding it). If the numbers match, the program processes the next line. If they do not match, it reports a checksum error in the current line and displays the line number.

Should someone type in the new program and enter an incorrect data or checksum value, the program indicates an error when run.

Using Datapoke

Type Datapoke in Basic on your Model I/III/4 (Program Listing 1) or Tandy 1000 (Program Listing 2) and save it. Datapoke uses the "Source" prompt to ask for the file name of the CMD program you want to convert, and the "Destination" prompt for the name of the Basic program that you want to create.

Datapoke opens the files, displays the

Program Listing 1. Datapoke for Models I/III/4. See p. 116 for information on using the checksums in Listings 1 and 2.

```

10 CLS:PRINT"DATAPOKE WITH CHECKSUM -- BY DAVID GOBLEN":PRINT
20 PRINT:PRINT"THIS PROGRAM CONVERTS A MACHINE LANGUAGE (CMD) PR
   OGRAM,"
30 PRINT"THE SOURCE FILE, TO A BASIC LANGUAGE FORMAT FILE; THE"
40 PRINT"DESTINATION FILE":PRINT:ON ERROR GOTO 0
50 CLEAR:DEFINT A-Z:Q$=CHR$(34)
60 SF$="":LINE INPUT"SOURCE MACHINE LANGUAGE FILE: ";SF$:OPEN"1"
   ,SF$:CLOSE
70 DF$="":LINE INPUT"DESTINATION BASIC LANGUAGE FILE: ";DF$
80 IF DF$=SF$ THEN 130
90 T1$=SF$:X=INSTR(SF$,"."):IF X THEN T1$=LEFT$(SF$,X-1)
100 T2$=DF$:X=INSTR(DF$,"."):IF X THEN T2$=LEFT$(DF$,X-1)
110 IF T1$=T2$ THEN IF T1$=SF$ OR T2$=DF$ THEN 130
120 OPEN"O",2,DF$:GOTO 140
130 PRINT"MATCHING FILESPECS!!!":FOR X=1 TO 3000:NEXT:PRINT:GOTO
   60
140 OPEN"R",1,SF$:FIELD 1,1 AS A$:P1=PEEK(VALPTR(A$)+1)+256*PEEK
   (VALPTR(A$)+2)
150 IF P1>32767 THEN P=P1-65536:ELSE P=P1
160 PRINT#2,"10 DATA POKE FORMAT CREATED ON DATAPOKE/BAS"
170 PRINT#2,"20 CLS:PRINT"Q$"BUILDING "T1$""Q$":RESTORE"
180 PRINT#2,"30 OPEN"Q$"O"Q$,1,"Q$;T1$;Q$":L=90"
190 PRINT#2,"40 CS=0:L=L+10"
200 PRINT#2,"50 READ A$:IF A$="Q$END"Q$THEN CLOSE:END"
210 PRINT#2,"60 IF LEFT$(A$,1)="Q$"-Q$THEN IF VAL(MID$(A$,2))=
   CS THEN 40 ELSE PRINT"Q$CHECKSUM ERROR IN LINE"Q$":L:END"
220 PRINT#2,"70 A=VAL(A$):PRINT#1,CHR$(A$);CS=CS+A"
230 PRINT#2,"80 GOTO 50":PRINT#2,"90 "" DATA AREA ""
240 PRINT#2,"100 DATA ";Q$="":DC=0:X=0:Y=1:GET 1,L:CS=0:L=L+10
250 PRINT:PRINT"NUMBER OF RECORDS:"LOF(1)": WORKING ON..."
260 PRINT"RECORD 1,"
270 GOSUB 310:IF A=2 THEN 290
280 GOSUB 310:Z=A:FOR Z1=1 TO Z:GOSUB 310:NEXT Z1:GOTO 270
290 FOR Z=1 TO 3:GOSUB 310:NEXT Z:IF CF=0 THEN GOSUB 340
300 PRINT#2,"END":CLOSE:PRINT:PRINT"...DONE":END
310 A=PEEK(P+X):X=X+1:IF X>255 THEN X=0:Y=Y+1:GET 1,Y:PRINT,"REC
   ORD"STR$(Y)";
320 PRINT#2,Q$;MID$(STR$(A),2);Q$="":CF=0:CS=CS+A
330 DC=DC+1:IF DC<15 THEN RETURN
340 PRINT#2,"-MID$(STR$(CS),2):CS=0:DC=0:CF=1
350 PRINT#2,CHR$(13);Q$="":PRINT#2,MID$(STR$(L),2)" DATA ";L=L
   +10:RETURN

```

End

Program Listing 2. Datapoke for the Tandy 1000.

```

10 CLS:PRINT"DATAPOKE WITH CHECKSUM -- BY DAVID GOBLEN":PRINT
20 PRINT:PRINT"THIS PROGRAM CONVERTS A MACHINE LANGUAGE (COM) PROG
   RAM,"
30 PRINT"THE SOURCE FILE, TO A BASIC LANGUAGE FORMAT FILE; THE"
40 PRINT"DESTINATION FILE":PRINT:ON ERROR GOTO 0
50 CLEAR:DEFINT A-Z:Q$=CHR$(34)
60 SF$="":LINE INPUT"SOURCE MACHINE LANGUAGE FILE: ";SF$:OPEN"1",1
   ,SF$:CLOSE
70 DF$="":LINE INPUT"DESTINATION BASIC LANGUAGE FILE: ";DF$
80 IF DF$=SF$ THEN 130
90 T1$=SF$:X=INSTR(SF$,"."):IF X THEN T1$=MID$(SF$,X+1)
100 T2$=DF$:X=INSTR(DF$,"."):IF X THEN T2$=MID$(DF$,X+1)
110 IF T1$=T2$ THEN IF T1$=SF$ OR T2$=DF$ THEN 130
120 OPEN"O",2,DF$:GOTO 140
130 PRINT"MATCHING FILESPECS!!!":FOR X=1 TO 3000:NEXT:PRINT:GOTO 60
140 OPEN"R",1,SF$:FIELD 1,1 AS A$:RL=LOF(1)/512:IF LOF(1)>RL*512
   THEN RL=RL+1
150 PRINT#2,"10 DATA POKE FORMAT CREATED ON DATAPOKE/BAS"
160 PRINT#2,"20 CLS:PRINT"Q$"BUILDING "T1$""Q$":RESTORE"
170 PRINT#2,"30 OPEN"Q$"O"Q$,1,"Q$;T1$;Q$":L=90"
180 PRINT#2,"40 CS=0:L=L+10"
190 PRINT#2,"50 READ A$:IF A$="Q$END"Q$THEN CLOSE:END"
200 PRINT#2,"60 IF LEFT$(A$,1)="Q$"-Q$THEN IF VAL(MID$(A$,2))=CS
   THEN 40 ELSE PRINT"Q$CHECKSUM ERROR IN LINE"Q$":L:END"
210 PRINT#2,"70 A=VAL(A$):PRINT#1,CHR$(A$);CS=CS+A"
220 PRINT#2,"80 GOTO 50":PRINT#2,"90 "" DATA AREA ""
230 PRINT#2,"100 DATA ";Q$="":DC=0:X=0:Y=1:CS=0:L=L+10
240 PRINT:PRINT"NUMBER OF RECORDS:"RL": WORKING ON..."
250 PRINT"RECORD 1,"
260 GOSUB 310:IF LOC(1)<LOF(1) THEN 270
270 GOSUB 340:PRINT#2,"END":CLOSE:PRINT:PRINT"...DONE":END
310 GET 1:X=X+1:IF X>512 THEN X=0:Y=Y+1:PRINT,"RECORD"STR$(Y)";
320 PRINT#2,Q$;MID$(STR$(ASC(A$)),2);Q$="":CF=0:CS=CS+ASC(A$)
330 DC=DC+1:IF DC<15 THEN RETURN
340 PRINT#2,"-MID$(STR$(CS),2):CS=0:DC=0:CF=1
350 PRINT#2,CHR$(13);Q$="":PRINT#2,MID$(STR$(L),2)" DATA ";L=L+1
   0:RETURN

```

End

System Requirements

Model I/III/4 or Tandy 1000

16K RAM

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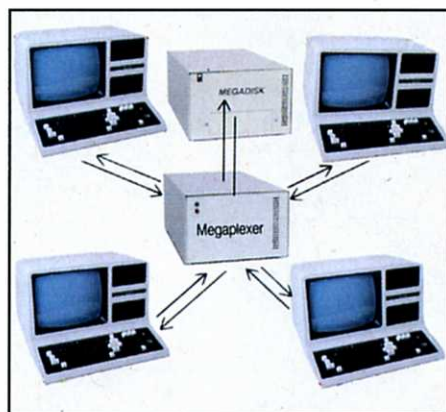
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number of records that it will process, and reports as it works on each record. It saves the new Basic program in ASCII format.

Hex It

If you prefer to have the Data Statements in hexadecimal (hex) format (Models 4 or 1000), you can make the following changes. In line 220, change `A=VAL(A$)` to `A=VAL("&H"&"Q$"+A$)`. In line 320, replace `MID$(STR$(A),2)` with `B$`.

For the Model 4, insert line 315 `B$=HEX$(A): IF LEN(B$)=1 THEN B$="0"+B$`. For the Tandy 1000, insert line 315 as above but replace (A) with (ASC(A)).

With the above changes, the data will be printed in hex, but the checksum at the end of the line will still be decimal.

The Rub

Datapoke can turn a 10-page assembly listing into two pages of Data statements (an 80-percent reduction). The disadvantage is that data listings do not show how a program operates as clearly as an assembly-code listing. ■

David Goben is a programming consultant. Write to him at 67 Highland Road, Mansfield Center, CT 06250.

Some decimal-to-fraction conversion routines are not applicable to the real world. They produce fractions that most people have no use for, such as 3/200. My routine, Jimsfrac, converts decimals to fractions that are used in the trades: 64ths, 32nds, 16ths, eighths, fourths, and halves.

In most cases, a decimal doesn't convert exactly to a fraction, so lines 220 and 240 round off a decimal to the next 64th. This produces a result that is accurate enough for most industrial and trade purposes.

To convert to fractions in 32nds,

you must change .015625 to .03125 and .984375 to .96875 in line 220. Change .015625 to .03125 in line 240. Finally, you must change 1000000 to 100000, 15625 to 3125, and 64 to 32 in line 280.

To convert to fractions in 16ths, you must change .015625 to .0625 and .984375 to .9375 in line 220. Also, you must change .015625 to .0625 in line 240. Finally, you must change 1000000 to 10000, 15625 to 625, and 64 to 16 in line 280.

Jim C. Cahlik
Parma, OH

Program Listing, Jimsfrac

```

10 ' JIMSFAC BY JIM C. CAHLIK 01/21/87
20 CLS
40 GOSUB 50:PRINT W$:GOTO 30
30 LINE INPUT"ENTER DECIMAL (XXX.XXXXX) ";U$
50 A=VAL(U$):B=INT(A):D=A-B:C=(INT(D/.015625))*0.015625
60 IF D>.984375 THEN B=B+1:C=0:GOTO 80
70 IF B<A THEN C=C+.015625:GOTO 70
80 U$=STR$(B)+STR$(C):V=INSTR(U$,".")
90 IF V=0 THEN W$=STR$(B):RETURN
100 C=INT(C*1000000):NU=C/15625:DE=64
110 IF NU>2 AND DE/2=INT(DE/2) AND NU/2=INT(NU/2) THEN DE=DE/2:N
    U=INT(NU/2):IF NU>2 THEN 110
120 IF NU=2 THEN DE=DE/2:NU=NU/2
130 W$=STR$(B)+" "+STR$(U)+" "+STR$(DE)
140 RETURN

```

End

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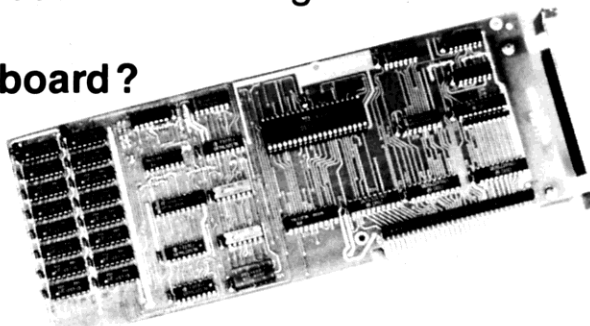
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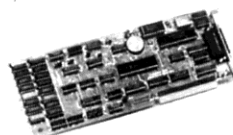
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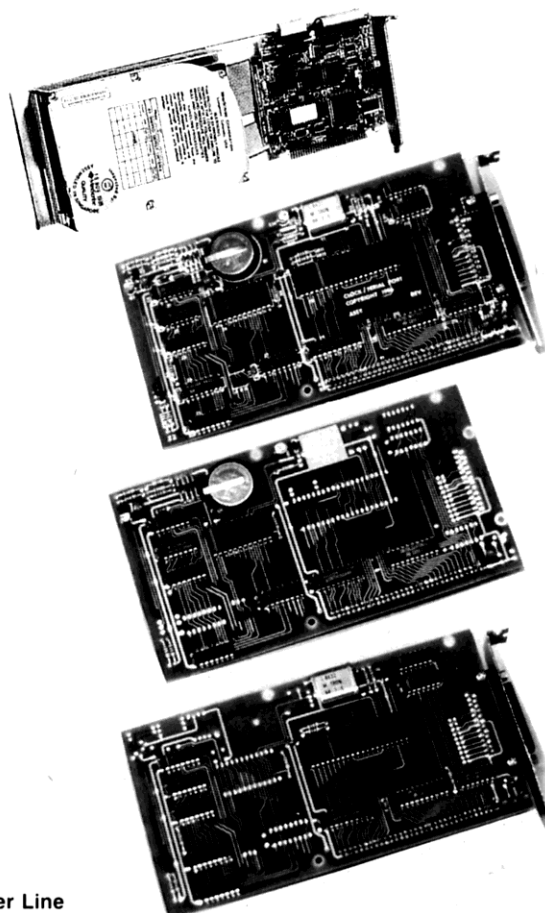
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Strip Your TRSDOS

Purge unprotected files from your system disks in one step.

Remove4 is an assembly-language, automatic-purge utility for the Model 4 that removes all visible, unprotected files from a disk in a specified drive. I wrote Remove4 to solve a simple, yet nagging problem.

The Model 4 TRSDOS disk has little room for user files. You must either write your files to a data disk in drive 1 or strip the TRSDOS disk of unnecessary utilities and SYS files with the Remove or Purge commands.

If you write your files to drive zero, you'll end up with many different TRSDOS configurations. You *should* immediately make and label a copy of each new configuration, but I often start using the disk for my application before making a backup. (Sound familiar?) Even with the extra space, the disk eventually becomes filled.

Before I wrote Remove4, I had to either back up the original TRSDOS master and configure it the same as my work disk, or back up my work disk and then remove or purge the user files to get a fresh disk. Either way, it was extra work.

Remove4

Once you assemble and execute the utility (see the Program Listing), a screen prompt asks you to type the drive number (zero-7) containing the disk with the unwanted files. Typing **Q** at this prompt returns you to TRSDOS.

The program checks to see if the chosen drive is in the drive-code table. If it isn't, you'll see a message telling you so, and Remove4 returns you to the drive-number prompt.

If the program recognizes the drive, it then checks to see if the specified drive is ready. If not, you'll get another message, and Remove4 returns to the drive-number prompt.

If the drive is ready, the utility displays the directory of the chosen drive and asks you to verify that you really want to re-

move all the files. Remove4 lists all visible files, but it will not delete visible protected files. Responding with **N** or **Q** returns you to the drive-number prompt.

Typing **Y** automatically removes the unprotected files one by one. The bottom line of the screen (line 23) displays the file name currently being removed. Don't be alarmed if Remove4 seems to be removing a protected file; once the purge is complete, a directory of the drive will show that all protected files remain.

The program tells you when it has removed all the visible, unprotected files. Pressing any key at this point returns the utility to the drive-number prompt. Here you can either repeat the process on another disk by inserting the disk and typing the appropriate drive number, or type **Q** to return to DOS.

Remove4 removes files on 5¼- or 8-inch, single- or double-sided DOS and data disks alike. It can handle up to 254 files on any one disk. (This is the maximum number of files that TRSDOS allows.)

Remove4 should work on a hard disk, as long as the number of files on the specified drive does not exceed 254.

To execute, the system disk must have the following TRSDOS files: SYS0/SYS, SYS1/SYS, SYS2/SYS, SYS3/SYS, SYS10/SYS, and SYS12/SYS. This information can be on a disk in drive zero or residing in memory.

Final Notes

I used the Model III EDTASM program patched to work on a Model 4 to create Remove4. You can type it in using any of the currently available Model 4 editor/assemblers.

I've liberally commented the source code, so anyone with some knowledge of assembly or who has the Model 4 technical reference manual should find it easy to follow the flow of the code. I welcome any comments regarding this utility. ■

Write to Lance Wolstrup at 20311 Sherman Way #221, Canoga Park, CA 91306.

Program Listing. Remove4.

```

00100 ;*****
00110 ;*      REMOV4/SRC      by Lance Wolstrup      *
00120 ;*      20311 Sherman Way #221, Canoga Park, CA 91306      *
00130 ;*
00140 ;* A utility for TRSDOS 6.x.x. that removes all visible *
00150 ;* user files from specified diskette *
00160 ;*****
00170      ORG      2600H      ;ASSEMBLE AT 2600H
00180 START      CALL      CLS      ;ERASE SCREEN
00190      CALL      NOCURS      ;TURN OFF CURSOR
00200      CALL      SCREEN      ;DISPLAY LINES 0-4 ON SCREEN
00210      CALL      PROT      ;SCROLL PROTECT TOP 5 LINES
00220      JP      BEGIN      ;JUMP OVER SUBROUTINES
00230 ;
00240 ; ***** SUBROUTINES *****
00250 ; ** EXIT TO DOS **
00260 QUIT      CALL      UNPROT      ;REMOVE SCROLL PROTECT
00270      CALL      CLS      ;ERASE SCREEN
00280      LD      HL,0      ;HL=0 MEANS NORMAL RETURN TO DOS
00290      LD      A,22
00300      RST      28H      ;@EXIT
00310 ; ** ERASE SCREEN **
00320      CLS      LD      A,1CH      ;PRINT CHR$(28) - HOME CURSOR
00330      CALL      DSP
00340      LD      A,1FH      ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
00350      CALL      DSP
00360      RET
00370 ; ** POSITION CURSOR **
00380 ; NOTE VERTICAL (H) AND HORIZONTAL (L) HAS BEEN LOADED BY CALLER
00390 LOCATE      LD      A,15
00400      LD      B,3      ;MOVE CURSOR TO HL - EVEN IF INVISIBLE
00410      RST      28H      ;@VDCTL
00420 ; ** SCROLL PROTECT TOP 5 LINES **
00430 PROT      LD      A,15
00440      LD      B,7      ;SCROLL PROTECT FUNCTION
00450      LD      C,5      ;PROTECT 4 LINES
00460      RST      28H      ;@VDCTL
00470      RET
00480 ; ** REMOVE SCROLL PROTECT **
00490 UNPROT      LD      A,15

```

Listing continued

System Requirements

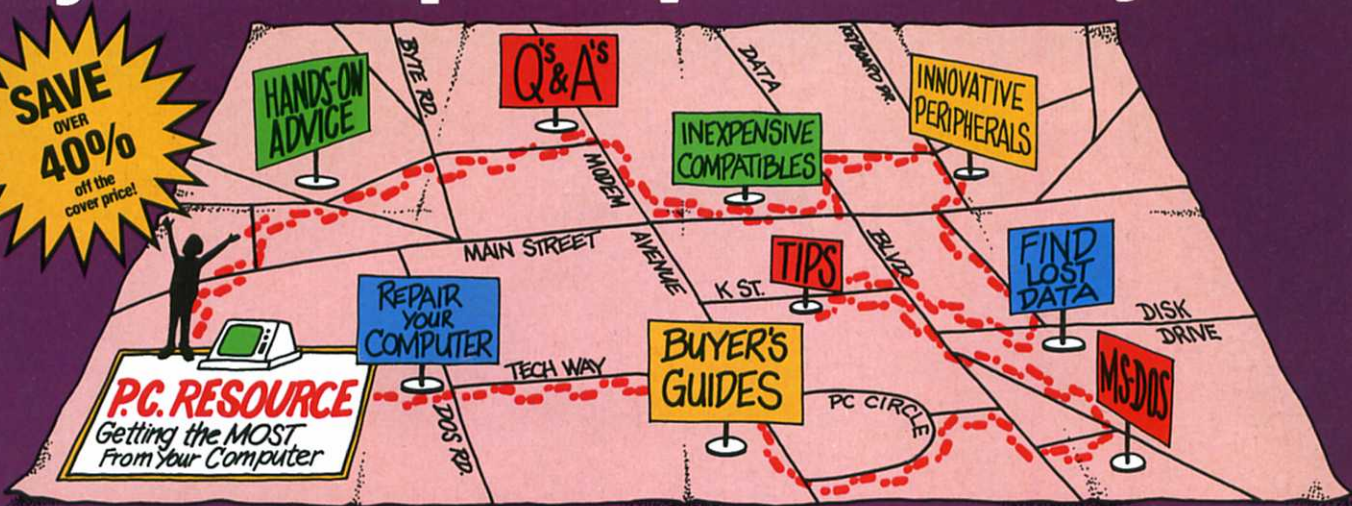
Model 4

TRSDOS 6.x

Editor/assembler

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```

00500 LD B,7
00510 LD C,0
00520 RST 28H
00530 RET
00540 ; ** DISPLAY MESSAGES **
00550 CHROUT LD A,(HL)
00560 OR A
00570 LD Z,A
00580 LD C,A
00590 LD A,2
00600 RST 28H
00610 INC HL
00620 JR CHROUT
00630 ; ** WAIT FOR KEYPRESS **
00640 INKEY LD A,1
00650 RST 28H
00660 RET
00670 ; ** DISPLAY CHARACTER **
00680 DSI LD C,A
00690 LD A,2
00700 RST 28H
00710 LD A,C
00720 RET
00730 ; ** TURN OFF CURSOR **
00740 NOCURS LD A,15
00750 CALL DSP
00760 RET
00770 ; ** TURN ON CURSOR **
00780 CURSOR LD A,14
00790 CALL DSP
00800 RET
00810 ; ** DISPLAY *PRESS ANY KEY TO CONTINUE* AND WAIT FOR KEYPRESS **
00820 ANYSUB LD H,23
00830 LD L,27
00840 CALL LOCATE
00850 LD HL,ANYKEY
00860 CHROUT
00870 CALL CURSOR
00880 CALL INKEY
00890 NOCURS
00900 LD H,5
00910 LD L,29
00920 CALL LOCATE
00930 LD A,1FH
00940 CALL DSP
00950 RET
00960 ; ** SELECTED DRIVE IS NOT CONFIGURED IN DRIVE CODE TABLE **
00970 NODRV LD H,20
00980 LD L,25
00990 CALL LOCATE
01000 LD HL,NDMMSG1
01010 CHROUT
01020 CALL ANYSUB
01030 INKEY1
01040 ; ** SELECTED DRIVE EITHER CONTAINS NO DISK OR CANNOT READ DISK **
01050 NODSK LD H,20
01060 LD L,27
01070 CALL LOCATE
01080 LD HL,NDMMSG2
01090 CHROUT
01100 CALL ANYSUB
01110 INKEY1
01120 ; ** DISPLAY COPYRIGHT, PROGRAM NAME AND DESCRIPTION ON THE **
01130 ; ** TOP 3 LINES (0-2) - THEN DRAW VERTICAL LINE ON 4TH LINE (3) **
01140 SCREEN LD H,0
01150 LD L,25
01160 CALL LOCATE
01170 LD HL,MSG1
01180 CHROUT
01190 LD H,1
01200 LD L,29
01210 CALL LOCATE
01220 LD HL,MSG2

```

```

;SCROLL PROTECT FUNCTION
;PROTECT 0 LINES
;RVDC TL

;PUT CHARACTER FROM HL INTO A
;IS IT TERMINATING BYTE - 0
;IF 0 - TERMINATE MESSAGE
;PUT CHARACTER INTO C

;BDSP
;POINT TO NEXT CHARACTER IN MESSAGE
;GO BACK AND DO IT AGAIN

;KEY

;PUT CHARACTER INTO C

;BDSP
;PUT CHARACTER BACK INTO A

;PRINT CHR$(15) - CURSOR OFF

;PRINT CHR$(14) - CURSOR OFF

;PRESS ANY KEY TO CONTINUE* AND WAIT FOR KEYPRESS **
;POSITION CURSOR AT LINE 23
;COLUMN 27

;DISPLAY ANYKEY MESSAGE

;TURN ON CURSOR
;WAIT FOR KEYPRESS
;TURN OFF CURSOR
;POSITION CURSOR AT LINE 5
;COLUMN 29

;PRINT CHR$(31) - ERASE TO END OF DISPLAY

; ** SELECTED DRIVE IS NOT CONFIGURED IN DRIVE CODE TABLE **
;POSITION CURSOR AT LINE 20
;COLUMN 25

;DISPLAY NDMMSG1

;DISPLAY ANYKEY MESSAGE
;GO BACK AND ASK FOR DRIVE NUMBER
;GO BACK AND ASK FOR DRIVE NUMBER
;POSITION CURSOR AT LINE 0
;COLUMN 25

;DISPLAY COPYRIGHT MESSAGE
;POSITION CURSOR AT LINE 1
;COLUMN 29

;DISPLAY NAME OF PROGRAM

```

```

01230 CALL CHROUT
01240 LD H,2
01250 LD L,9
01260 LOCATE
01270 CALL HL,MSG3
01280 CHROUT
01290 LD H,3
01300 LD L,0
01310 LOCATE
01320 LD B,80
01330 PRT131
01340 CALL DSP
01350 DJNZ PRT131
01360 RET
01370 ; *** PROGRAM BEGINS HERE ***
01380 BEGIN LD HL,DIRBUF
01390 LD B,22
01400 LD A,20H
01410 (HL),A
01420 HL
01430 CLEAR
01440 DJNZ H,5
01450 LD L,0
01460 HL
01470 LOCATE
01480 CALL A,1FH
01490 CALL DSP
01500 POP HL
01510 CALL LOCATE
01520 LD HL,WCHDRV
01530 CHROUT
01540 CALL CURSOR
01550 INKEY
01560 CALL 51H
01570 JP Z,QUIT
01580 CP 71H
01590 JP Z,QUIT
01600 CP 30H
01610 JR C,INKEY1
01620 CP 38H
01630 NC,INKEY1
01640 PUSH AF
01650 NOCURS
01660 CALL AF
01670 POP AF
01680 CALL DSP
01690 SUB 30H
01700 LD (SRCBUF),A
01710 LD C,A
01720 LD A,40
01730 RST 28H
01740 NZ,NODRV
01750 LD A,(SRCBUF)
01760 LD C,A
01770 RST 28H
01780 NZ,NODSK
01790 LD A,(SRCBUF)
01800 LD B,A
01810 LD C,0
01820 LD HL,DIRBUF
01830 LD A,35
01840 RST 28H
01850 LD HL,DIRBUF
01860 LD A,(HL)
01870 LD C,20H
01880 CP 20H
01890 JP Z,EMPTY
01900 LD H,5
01910 LD L,0
01920 HL
01930 PUSH LOCATE
01940 CALL A,1FH
01950 CALL DSP

```

```

; POSITION CURSOR AT LINE 2
; COLUMN 9

; DISPLAY DESCRIPTION OF PROGRAM

; POSITION CURSOR AT LINE 3
; COLUMN 0

; DRAW HORIZONTAL LINE - STRINGS(80,131)

; POINT HL TO BUFFER CONTAINING DIR

; PUT SPACES IN 1st 22 BYTES OF DIRBUF

; POSITION CURSOR ON LINE 5
; COLUMN 0
; SAVE CURSOR LOCATION

; PRINT CHR$(31) - ERASE TO END OF DISPLAY

; RESTORE CURSOR LOCATION

; PRINT MESSAGE ON SCREEN

; TURN ON CURSOR
; WAIT FOR KEYPRESS

; IF Q IS PRESSED - BACK TO DOS

; IF Q IS PRESSED - BACK TO DOS

; JUMP IF SMALLER THAN 0

; JUMP IF EQUAL OR LARGER THAN 8
; SAVE DRIVE NUMBER IN A
; TURN OFF CURSOR
; RESTORE DRIVE NUMBER
; DISPLAY IT
; GET TRUE DRIVE NUMBER
; STORE IT IN SRCBUF

; BOCSTAT - IS DRIVE DEFINED IN DCT
; ERROR SO JUMP TO NODRV
; PUT DRIVE NUMBER INTO A
; PUT IT INTO C

; CHDRV - IS A FORMATTED DISKETTE
; IN SELECTED DRIVE
; ERROR - JUMP TO NODSK
; PUT DRIVE NUMBER INTO A
; PUT IT INTO B
; GET DIRECTORY AF ALL VISIBLE FILES
; POINT TO BUFFER

; GRANDIR - GET DIRECTORY RECORDS
; POINT HL TO 1st CHR IN DIRBUF
; PUT CHR INTO A
; IS IT A SPACE
; NO RECORDS - JUMP TO EMPTY
; POSITION CURSOR AT LINE 5
; COLUMN 0
; SAVE CURSOR LOCATION

; PRINT CHR$(31) - ERASE TO END OF DISPLAY

```

Listing continued

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Listing continued

```

01960 POP HL LOCATE
01970 CALL A, (SRCBUF)
01980 LD C, A
01990 LD B, 0
02000 LD B, 34
02010 RST 28H
02020 LD H, 23
02030 LD L, 27
02040 CALL LOCATE
02050 LD HL, REMMSG
02060 CALL CHROUT
02070 CALL INKEY
02080 INKEY2
02090 CP 51H
02100 JP Z, BEGIN
02110 CP 71H
02120 JP Z, BEGIN
02130 CP 4EH
02140 JP Z, BEGIN
02150 CP 6EH
02160 JP Z, BEGIN
02170 CP 59H
02180 JP Z, CNTNUE
02190 CP 79H
02200 JP Z, CNTNUE
02210 INKEY2
02220 NOCURS
02230 CNTNUE
02240 LD H, 23
02250 LD L, 0
02260 PUSH HL
02270 CALL LOCATE
02280 LD A, IEH
02290 CALL DSP
02300 POP HL
02310 LOCATE
02320 HL, REMFIL
02330 CHROUT
02340 LD HL, DIRBUF
02350 LD (BUFLOC), HL
02360 LD B, 14
02370 LD A, (HL)
02380 LD B, 28H
02390 JP Z, EOF
02400 CALL DSP
02410 INC HL
02420 DJNZ LOOP01
02430 LD L, (IX+0)
02440 LD L, (IX+1)
02450 LD H, (IX+1)
02460 LD DE, FCB
02470 LD A, 78
02480 RST 28H
02490 LD DE, 17
02500 LD HL, DE
02510 LD B, (HL)
02520 LD HL, IOBUF
02530 LD DE, FCB
02540 LD A, 59
02550 RST 28H
02560 LD A, 57
02570 LD DE, FCB
02580 RST 28H
02590 LD L, (IX+0)
02600 LD L, (IX+1)
02610 LD DE, 22
02620 ADD HL, DE
02630 PUSH HL
02640 LD H, 23
02650 LD L, 14
02660 PUSH HL
02670 CALL LOCATE
02680 LD A, IEH
02690 CALL DSP
;RESTORE CURSOR LOCATION
;GET DRIVE NUMBER
;PUT IT IN C
;SELECT VISIBLE NON-SYSTEM FILES
;BODIR - DISPLAY DIRECTORY
;POSITION CURSOR AT LINE 23
;COLUMN 27
;DISPLAY REMMSG
;TURN ON CURSOR
;WAIT FOR KEYPRESS
;IF Q - JUMP TO BEGIN
;IF q - JUMP TO BEGIN
;IF N - JUMP TO BEGIN
;IF n - JUMP TO BEGIN
;IF Y - JUMP TO CNTNUE
;IF y - JUMP TO CNTNUE
;JUMP BACK TO INKEY2
;TURN OFF CURSOR
;POSITION CURSOR AT LINE 23
;COLUMN 0
;SAVE CURSOR POSITION
;PRINT CHR$(30) - ERASE TO END OF LINE
;RESTORE CURSOR POSITION
;DISPLAY REMFIL MESSAGE
;POINT HL TO DIRBUF
;PUT ADDRESS OF DIRBUF INTO BUFLOC
;LENGTH OF FILENAME/EXT:D
;GET CHARACTER INTO A
;IS IT + (* MARKS BUFFER END)
;IF CHARACTER IS + JUMP TO EOF
;DISPLAY IT
;NEXT CHARACTER
;REPEAT UNTIL A CONTAINS +
;POINT IX TO BUFLOC
;GET LSB OF CURRENT BUFFER LOCATION
;GET MSB OF CURRENT BUFFER LOCATION
;POINT DE TO FILE CONTROL BLOCK
;FSPC - MOVES FILE FROM BUFFER TO FCB
;POINT HL TO LBL BYTE
;PUT IT INTO B
;POINT HL TO IO BUFFER
;POINT DE TO FILE CONTROL BUFFER
;OPEN - OPENS FILE IN FCB
;POINT DE TO FILE CONTROL BLOCK
;REMOVE - REMOVES FILE
;GET LSB OF CURRENT BUFFER LOCATION
;GET MSB OF CURRENT BUFFER LOCATION
;POINT HL TO NEXT FILESPEC
;SAVE BUFFER LOCATION
;POSITION CURSOR AT LINE 23
;COLUMN 14
;SAVE CURSOR LOCATION
;PRINT CHR$(30) - ERASE TO END OF LINE

```

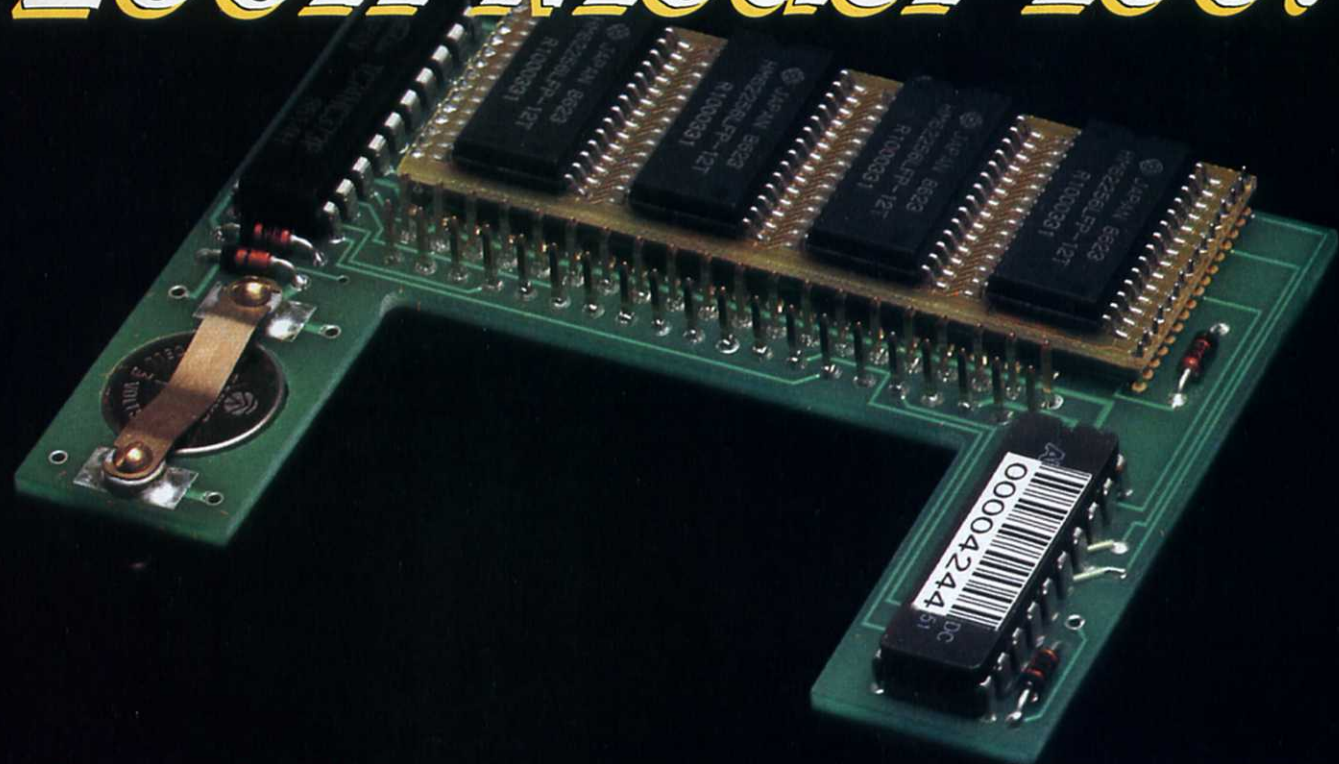
```

02700 POP CALL HL LOCATE
02710 CALL POP HL
02720 JR LOOP00
02730 LD A, 0
02740 LD A, 22
02750 LD A, 0
02760 LD A, 0
02770 LD A, 0
02780 LD A, 0
02790 LD A, 0
02800 LD A, 0
02810 LD A, 0
02820 LD A, 0
02830 LD A, 0
02840 LD A, 0
02850 LD A, 0
02860 LD A, 0
02870 LD A, 0
02880 LD A, 0
02890 LD A, 0
02900 LD A, 0
02910 LD A, 0
02920 LD A, 0
02930 LD A, 0
02940 LD A, 0
02950 LD A, 0
02960 LD A, 0
02970 LD A, 0
02980 LD A, 0
02990 LD A, 0
03000 LD A, 0
03010 LD A, 0
03020 LD A, 0
03030 LD A, 0
03040 LD A, 0
03050 LD A, 0
03060 LD A, 0
03070 LD A, 0
03080 LD A, 0
03090 LD A, 0
03100 LD A, 0
03110 LD A, 0
03120 LD A, 0
03130 LD A, 0
03140 LD A, 0
03150 LD A, 0
03160 LD A, 0
03170 LD A, 0
03180 LD A, 0
03190 LD A, 0
03200 LD A, 0
03210 LD A, 0
03220 LD A, 0
03230 LD A, 0
03240 LD A, 0
03250 LD A, 0
03260 LD A, 0
03270 LD A, 0
03280 LD A, 0
03290 LD A, 0
03300 LD A, 0
03310 LD A, 0
03320 LD A, 0
03330 LD A, 0
03340 LD A, 0
03350 LD A, 0
03360 LD A, 0
03370 LD A, 0
03380 LD A, 0
03390 LD A, 0
03400 LD A, 0
03410 LD A, 0
03420 LD A, 0
;RESTORE CURSOR POSITION
;RESTORE BUFFER LOCATION
;GO BACK AND GET NEXT FILE
;POSITION CURSOR AT LINE 22
;COLUMN 0
;PRINT CHR$(31) - ERASE TO END OF DISPLAY
;POSITION CURSOR AT LINE 22
;COLUMN 19
;DISPLAY DONE MESSAGE
;DISPLAY ANYKEY MESSAGE
;JUMP TO BEGIN
;POSITION CURSOR AT LINE 22
;COLUMN 0
;PRINT CHR$(31)
;POSITION CURSOR AT LINE 22
;COLUMN 28
;DISPLAY NOFIL MESSAGE
;DISPLAY ANYKEY MESSAGE
;JUMP BACK TO BEGIN
;***** SCREEN MESSAGES *****
03000 MSG1
03010 DEFH 21
03020 DEFH 143
03030 DEFH 244
03040 DEFH 245
03050 DEFH 246
03060 DEFH 32
03070 DEFH 32
03080 DEFH 239
03090 DEFH 32
03100 DEFH 32
03110 DEFH 21
03120 DEFH 0
03130 MSG2
03140 DEFH 0
03150 MSG3
03160 DEFH 0
03170 DEFH 0
03180 WCHDRV
03190 DEFH 0
03200 NDMMSG1
03210 DEFH 0
03220 NDMMSG2
03230 DEFH 0
03240 REMMSG
03250 DEFH 0
03260 REMFIL
03270 DEFH 0
03280 DONE
03290 DEFH 0
03300 NOFIL
03310 DEFH 0
03320 ANYKEY
03330 DEFH 0
03340 DEFH 0
03350 DEFH 0
03360 DEFH 0
03370 DEFH 0
03380 DEFH 0
03390 DEFH 0
03400 DEFH 0
03410 DEFH 0
03420 DEFH 0
;***** R E M O V E 4 *****
;Remove all visible, non-protected '
;files on selected diskette.'
;Remove files on which drive: '
;Selected drive is not available'
;Selected drive is not ready'
;Remove above files (Y/N) '
;Removing ----> '
;All visible, non-protected files removed'
;No visible files on disk'
;Press any key to continue '
;***** BUFFERS *****
;HOLD SELECTED DRIVE NUMBER
;HOLDS DIR INFO FROM BRAMDIR - ENOUGH
;FOR 254 FILES + 1 BYTE FOR BUFEND
;HOLDS ADDRESS OF CURRENT PLACE IN
;DIRBUF
;FILE CONTROL BLOCK
;I/O BUFFER - MANDATORY WITH @OPEN SVC

```

End

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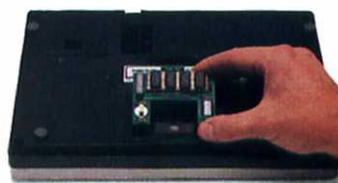


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Deskmate Printer Control

Use substitute characters to put your printer through its paces.

Deskmate for the Tandy 1000 does not allow you to place printer control codes within text. You can, however, control your printer within the text by using substitution characters, a procedure involving three steps:

- updating the configuration to include the printer driver;
- creating a table of substitution codes; and
- activating the table and inserting the codes into text.

Update the configuration by adding the following statement to Config.SYS:

```
DEVICE = LPDRVR.SYS
```

You can do this with Edlin. The easiest way to create Config.SYS is to copy statements to a file with that name from the console. At the DOS prompt type:

```
COPY CON CONFIG.SYS
DEVICE = ANSISYS
DEVICE = LPDRVR.SYS
^Z
```

Entering either control-Z or F6 terminates the Copy command and returns you to DOS. Refer to Appendix C of Tandy's *MS-DOS Reference Manual* (p. 309) for a further explanation of Config.SYS.

Creating the Substitution Characters

The second part of the procedure is more complex, since it uses the escape sequence that Appendix C describes. Before getting into this, identify a set of characters that you do not usually use in text files, such as the open brace {, close brace }, backslash \, vertical bar |, the difference sign (~) and ASCII 168 (¸). Then list the printer modes you want with their decimal and hexadecimal (hex) codes. You can find the codes in your printer manual. (For the DMP 120, they are on p. 35.)

The Table shows control-key conversions. You can find them in the scan-code list in Appendix B of the *MS-DOS Reference Manual*.

System Requirements

**Tandy 1000
Deskmate
Printer**

ence Manual (p. 297). To determine the appropriate conversion, find the hex representation in the column labeled CTRL. The corresponding key is under the column titled Keyboard Legend. You will see the purpose of these codes as you create the table file.

Notice that 01B appears in the CTRL column as both the escape key and the symbol ^[(more on this later).

Construct the control-key conversion table using characters you don't usually use in text files.

The table follows the format of the escape sequence:

```
ESC W n code string
```

in which "n" is the number of characters in the printer code, "code" is the decimal representation of the substitution character, and "string" is the appropriate printer code. For example, in:

```
ESC W 01 123 15
```

the printer code is one decimal character, and in:

```
ESC W 02 092 27 14
```

it is two decimal characters. The decimal representations of { and \ are 123 and 092, respectively.

File CHR120.DAT contains the table.

You can construct it using Basic or Edlin with the non-textual control characters you determined earlier. All alphabetic characters must be uppercase, so type:

```
EDLIN CHR120.DAT
```

at the DOS prompt.

Edlin returns:

```
New File
.
```

where "." is the command prompt. Enter "I" for Insert, and Edlin returns the line number 1.*. Enter the following after the line number:

```
control-V
[W
control-A
{
control-O
```

The line appears as typed:

```
1.*V[W^A{^O
```

Continue with the remaining lines as follows:

```
2.*V[W^A)^N
3.*V[W^B^V[^N
4.*V[W^B|^V[^O
5.*V[W^B~^V[^T
6.*V[W^B¸^V[^S
7.*^C
```

Entering control-C terminates the insert command. The command prompt, followed by L, lists the following six lines:

```
1.^W^A{^O
2.^W^A)^N
3.^W^B|^V[^N
4.^W^B|^V[^O
5.^W^B~^V[^T
6.*^W^B¸^V[^S
```

The command prompt (*) followed by E exits Edlin.

Substitute character	Printer mode	Decimal	Hex	Control-key conversion
{	start underline	15	0F	^O
}	end underline	14	0E	^N
\	start elongation	27 14	1B 0E	escape-^N
	end elongation	27 15	1B 0F	escape-^O
~	start condensed	27 20	1B 14	escape-^T
¸	return to standard	27 19	1B 13	escape-^S

Table. Control-key conversions.

An Explanation

Edlin uses the escape key to void current input. When it does so, all entries disappear. Its equivalent, '[', serves the same purpose. Edlin lets you enter these special codes if you enter control-V followed by [to create an escape. This is why the V disappears when the lines list.

The ^A and ^B commands designate the length of the string according to the format of the escape sequence. Hex values 001 and 002 (under the column heading CTRL of the scan-code table) represent keyboard entries ^A and ^B, respectively.

If you try to display this file using the DOS Type command, you will see a set of completely different characters, including arrows, smiling faces, music notes, and sunshines. These are the display-character equivalents of the ASCII code. The decimal equivalent of escape is 027, which displays as a left arrow.

The last thing to do before entering Deskmate is to activate your control file. Do this with the DOS Print command by entering:

```
PRINT CHR120.DAT./P
```

Your printer should advance a blank page. If it prints any characters, an error

***If a blank page
doesn't advance,
an error may
exist in the
escape sequence
of the control
file.***

probably exists in an escape sequence within the control file. To deactivate this control file, print a file containing ^X, which resets the printer driver.

The Figure shows the in-text command for underlining and the resulting output as an example. Now you can go to work creating your text in Deskmate. ■

John Heenan designs products with his Tandy 1000 and is a free-lance writer. Write to him at 319 Belmont, Placentia, CA 92970.

{UNDERLINE. One should note that the underline continues under all spaces as well. This will not be true for all printers. On my DWP 210 the underline does not print under the spaces between words. The underline will continue until the End Underline character.}

UNDERLINE.

One should note that the underline continues under all spaces as well. This will not be true for all printers. On my DWP210 the underline does not print under the spaces between words. The underline will continue until the End Underline character.

Figure. Demonstration of the underlining control code and the resulting printout.

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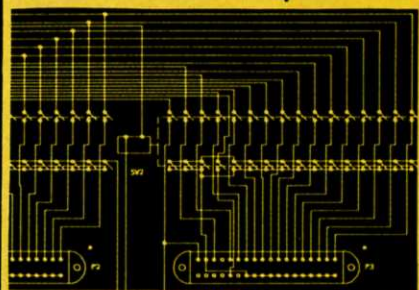
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Now, from the Author that brought you HyperCross, Hyperzap and SuperCross comes an amazing new program for owners of Tandy 1000, 1200, 3000 and true PC compatibles. PC Cross-Zap allows you to read all double density TRS-80 type disks on your PC. Not only that, PCXZ offers many of the features that TRS-80 owners have long enjoyed with HyperCross and HyperZap.

PC Cross-Zap is a utility program that runs on your PC or PC-compatible. With it you can copy files to or from TRS-80 disks at will. You can also format a disk, copy disks, explore, read and write sector data, repair bad directories and much more. Long after your TRS-80 is gone you will still be able to read your old disks. Even when your TRS-80 disks are gone you can continue to use PCXZ to read, fix and modify MS-DOS and other disks so your investment will never be lost.

Formats Supported: Model I mixed density: DOS+ 3.4, DoubleDOS, LDOS (SOLE), MultiDOS, NEWDOS 80 V2, TRSDOS 2.7/8. Model I/III Double Density: DOS+ 3.5, LDOS 5.1. Model III: DOS+ 3.4, MultiDOS, NewDOS 80, TRSDOS 1.3 Model 4/4P: MultiDOS, DOS+ 4, TRSDOS 6. Max-80: LDOS 5.1. All formats also supported in double sided, 35, 40 and 80 tracks where appropriate. For 80 track formats you must have an 80 track (720K or 1.2M High Density) drive on your PC.

Main Features: With PCXZ you can format a TRS-80 disk (not the mixed density Model I types). You can copy files from a TRS-80 disk **error free**, without losing any data. Just like **HyperCross 3.0** you can instruct PCXZ to convert your BASIC files on the fly as they are copied. ASCII and word processor text files are converted so they are in the correct format for your PC. Copying can be by file or using wild cards. You can also copy files from PC format back to your TRS-80 disks.

The Disk Zap, fix and copy features are perhaps the most exciting feature in any program ever offered in support of TRS-80 and MS-DOS disk formats. For the first time when you examine a disk the program tells you what you are looking at. For instance if you are inspecting a directory entry you will be told what each byte means as you move your cursor over it. This makes repair and modification a snap because you see the results of the change as you make it. Among the many things you can do are: remove passwords, rename, delete and undelete files. All is easy with the helpful prompts and action keys of **PC Cross-Zap**. The program comes with a manual that, also for the first time in one place, explains TRS-80 and MSDOS disk formats for all the different DOS versions.

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System Requirements: PC, XT, AT or compatible, Tandy 1000 or 1000EX (needs DMA), 1000 SX, 12000, 3000 with at least one **360K or 1.2M** drive and **256K minimum memory**. PCXZ can read, write and format 40 or 80 track TRS80 disks on a High Density drive.

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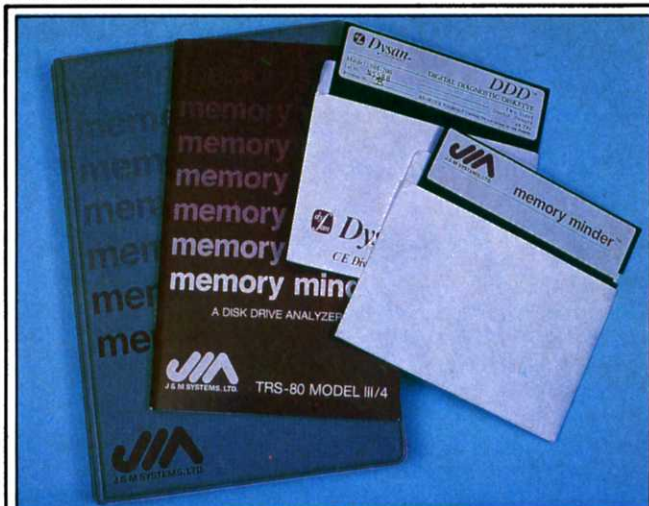
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Uncharted Territory

Last month, I showed you how to execute a batch file from another batch file and then return. This month, I am going to show you how to spawn a second batch-file job that executes after the current batch file completes. I'll also show you how to execute commands without reloading the DOS command processor and how to change variables in your master environment.

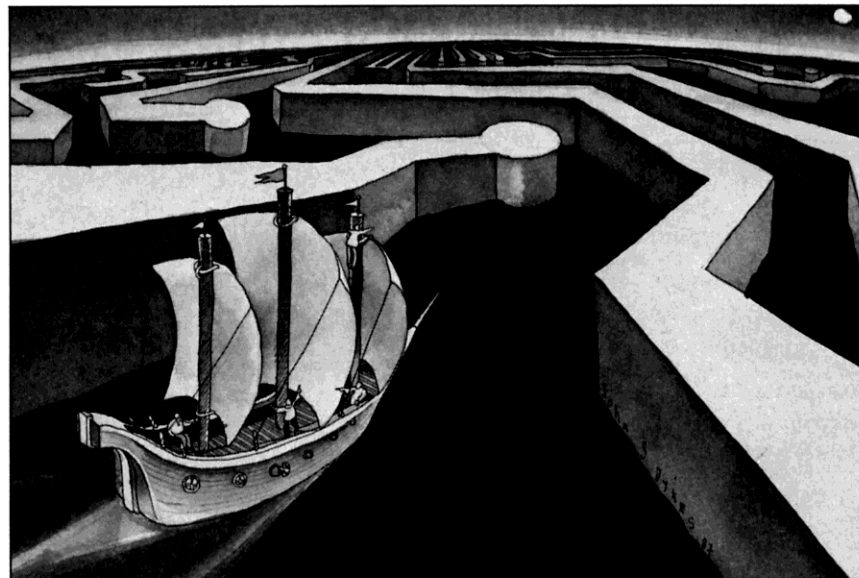
Before I get into these uncharted areas, I want to expand on two topics from last month's column. I discussed accessing DOS environment variables from within a batch file and said that I used this technique to keep my path current without changing the path statement in a massive number of batch files.

For example, suppose my path statement lists 10 subdirectories that DOS is supposed to search. Suppose that I no longer need the files in the third subdirectory in the path and I delete them, removing the subdirectory from the disk. I would have to go through each batch file on the disk and change the path statements to ensure that this subdirectory is not present. If I miss one and use the batch file, I will get a message stating that an invalid drive or directory is in the search path each time DOS has to search for a program not in the current directory.

The simplest solution uses the DOS Set command, which I described last month. You can use this command to access any environment variable, including the Path and Prompt variables. This means that you do not have to worry about finding all of the Path statements in your batch files; set it once in the Autoexec file and forget it.

For example, suppose that my starting path includes the directories C:\, C:\DOS, C:\DOS\UTIL, and C:\GAMES. If I delete all of the files in the Games directory and then remove that directory, I must also take this directory name out of the Path statement or I will get an error when DOS looks for a file.

I have quite a few batch files, and if I forget one of them that contains a change to the path, I create an error condition. Let the Set command do your work; the command SET PATH=C:\MSC;%PATH% appends the old value of the Path variable to the new string



C:\MSC and stores it back in the environment as your working Path statement. This procedure does not care what the previous path was. Now you can change your Autoexec path at will without worry.

The second topic concerns the example of one batch file calling a second and returning. The second batch file makes changes in its environment that the first batch cannot access because the second batch has an entirely separate environment. Nice as it would seem, you cannot use this technique to pass parameters between invocations of batch files.

I do not think I stressed this inability to change environments enough—each task that operates under MS-DOS gets a private copy of the current environment, and no others can get to this area. But you can still change the master environment; that is one of the topics of this month's column.

DOS Mysteries

MS-DOS has many undocumented features—some are worth exploiting and have remained stable from DOS release to release. Others are less useful and change frequently. One of the more useful features is DOS interrupt 2EH, which provides a rapid entry point into the primary (or first loaded) resident DOS command interpreter. No matter how many layers or shells you have loaded, this in-

Fig. 1. Debug script for creating EXCMD.

```
a 0100
MOV     AH,[0080]
OR      AH,AH
JZ      0144
MOV     BX,01C0
SHR     BX,1
SHR     BX,1
SHR     BX,1
SHR     BX,1
SHR     BX,1
INC     BX
MOV     AH,4A
INT     21
JB      0137
MOV     [01BE],SP
MOV     [01BC],SS
MOV     SI,0081
INT     2E
MOV     SP,CS:[01BE]
MOV     SS,CS:[01BC]
MOV     AH,4C
XOR     AL,AL
INT     21
MOV     AH,09
MOV     DX,0151
INT     21
MOV     AH,4C
MOV     AL,01
INT     21
```

Fig. continued

errupt quickly and easily executes your DOS commands without your reloading Command.COM.

This has several advantages. First, loading Command.COM takes time—time to find it, open the file, and load it. Second, you might have removed the floppy disk with Command.COM on it and now get delayed while DOS waits for you to replace the disk. A disadvantage to this technique is that certain DOS programs use the entire free space of memory, which destroys the transient portion of Command.COM. The worst offender is a Turbo Pascal-compiled program.

Another significant advantage is the ability to modify the master environment to allow this interrupt function to execute a DOS Set command. For example, the command SET VARIABLE1=STRING sets the environment variable Variable1 to String in the master environment. Note that these changes occur no matter how many levels you are nested because the DOS interrupt 2EH function processor always points to the primary-level command processor.

Using undocumented features can be dangerous, but I consider this case justified. It is present in all DOS releases from version 2.0 to 3.2. Since ADOS for protected-mode operation on the 80286 processors will probably be the next major release, I think you are safe in assuming that interrupt 2EH will remain available to the older DOS versions.

Examining EXCMD

The Program Listing contains the source code for EXCMD, which uses the remainder of its own command line as a command string to pass to DOS via interrupt 2EH. You can key this in directly and assemble it as I indicated in the leading comments. Figure 1 contains a Debug script to use in place of the assembly source code. Type in the statements in Fig. 1 and save them to a file called EXCMD.SCR. Then load Debug and use the command: DEBUG <EXCMD.SCR and press enter.

This is a simple program that illustrates several features. Most importantly, it demonstrates the use of memory-allocation requests to reduce the initial program's size. When DOS runs a COM program, it assigns all the remaining available memory to your task. This is not practical if you want to run any other process as a "child" of your current program, so you must calculate a maximum size you need and release the remaining memory to DOS.

Also, DOS interrupt 2EH has a disastrous variation from version 2 to 3. I initially developed this short program on an IBM PC under DOS 3.2, and every-

Fig. continued

```
MOV     AH,09
MOV     DX,017C
INT     21
MOV     AH,4C
MOV     AL,01
INT     21
DB      7,7
DB      'EXCMD - Fatal memory-allocation error!',d,a,'$'
DB      'EXCMD - Command string required',d,a
DB      'Command execution aborted!',d,a,'$'
```

Sample Batch File T1.BAT

```
dir/w
pause
excmd t2
rem This remark is executed after spawning off batch file T2
rem contents.
pause
```

Sample Batch File T2.BAT

```
rem In batch file number 2
pause
dir/p
pause
rem All done in batch file T2
```

Fig. 2. Example batch files.

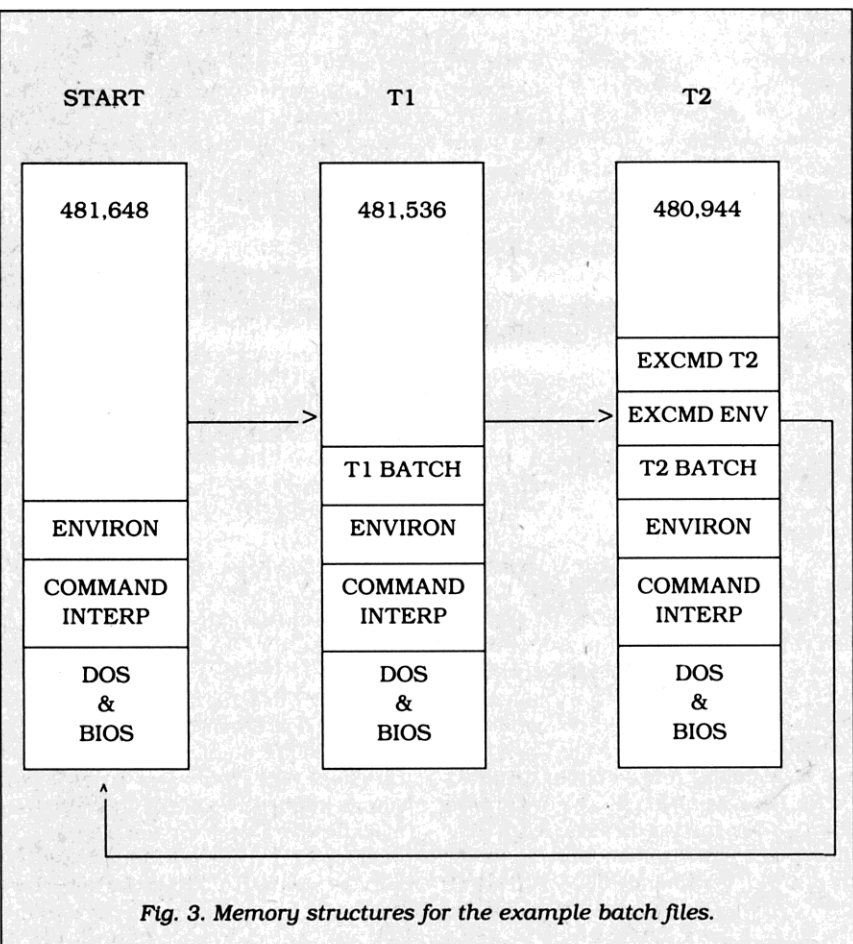


Fig. 3. Memory structures for the example batch files.

thing worked fine because the segment registers were protected. DOS 2 modifies all registers with the exception of CS and IP. Therefore, you must protect the stack pointer and segment registers.

Figure 2 contains two simple batch files to show what I initially claimed. If you type these in and execute them, a strange thing happens—batch file 1 runs completely to the end and finishes, and then batch file 2 starts to execute. It is almost as if you entered a command in the type-ahead buffer and then went on, letting the first batch file finish.

The diagram in Fig. 3 is a picture of memory while this example is running. First, DOS requires the amount of memory illustrated in the left box for itself, the basic input/output system (BIOS) code, the command interpreter, and the master environment. This uses 42,640 bytes out of my 512K memory (524,288 bytes). Depending on your DOS version, the number of files and buffers, and the device drivers loaded, your number could be more or less.

As the first batch file begins to execute, DOS creates a small memory block to control the batch file on top of the currently used memory (middle box). This reduces the total memory by 96 bytes for the control block. The extra difference between the left and middle boxes is 16 bytes allocated as a memory control header. Each block of memory allocated bears this header, which points to the beginning of the memory block and the

size, among other information.

The right box shows the picture you get after batch file 2 is executing. Note that the EXCMD program is still resident with its private copy of the environment. The difference of 592 bytes between the middle and right boxes is composed of a 16-byte header and 96-byte block for EXCMD's environment and a 16-byte header and 464-byte block for EXCMD itself.

As soon as both batch files have completed, the memory allocation returns to the starting condition. DOS releases all unused blocks and returns them to the dynamic allocation pool.

Conclusion

EXCMD is another useful tool to add to your stock. You will have to experiment with it to appreciate its power. Batch files are valuable for effective use of your computer, especially if you have a hard disk.

I want to hear your needs and problems. Please write or contact me via Compuserve 73016,1326. I regularly attend the Tandy computer forum (TRS80PRO), and you can leave your questions via Easyplex. ■

John B. Harrell III is a naval electronic warfare systems analyst. He has written for 80 Micro for five years and programs in Pascal, C, and assembly language. Contact him c/o 80 Micro, 80 Elm St., Peterborough, NH 03458.

Program Listing. EXCMD.

PAGE ,132
TITLE EXCMD - Fast DOS Command Executer
NAME EXCMD

```
*****
*
* PROGRAM:
*
* EXCMD executes DOS commands without reloading the DOS
* command processor. This program uses an undocumented
* interrupt vector pointing to the system's primary (or
* first loaded) command processor.
*
* EXCMD uses DOS interrupt vector 2EH, which exists in all
* current versions of MS-DOS/PC-DOS from version 2.0 to
* the existing version 3.
*
* Any DOS command, EXE program, COM program, or BAT file
* can be executed using this simple extension to DOS just
* as you would from the DOS command prompt.
*
* SYNOPSIS:
*
* EXCMD [command line with optional parameters]
*
* EXPLANATION:
*
* DOS parses the command line above, leaving the
* bracketed command tail in the command line buffer in
* the current task's program segment prefix (PSP)
* beginning at offset 0080H. This first byte is a count
* of the characters in the command tail minus the ending
* carriage return. If the character count byte is zero,
* the command tail is absent.
*
* EXCMD passes this command string contained in the tail
* directly to the primary command processor for action.
* Note that some DOS programs may contaminate the
* transient portion of Command.COM and succeeding DOS
* commands might not execute properly.
*
* Also note that using any DOS command that modifies the
* operating system's environment WILL AFFECT ONLY THE
```

Listing continued

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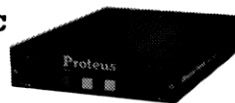


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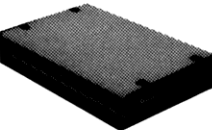
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JOHN'S MS-DOS COLUMN

Listing continued

```

; *
; * PRIMARY OR MASTER ENVIRONMENT COPY. Other environments
; * loaded on top of the primary environment will not
; * change.
; *
; *
; * ASSEMBLING:
; * To build an executable program file from the assembly
; * source, follow these simple steps after entering the
; * source code:
; *
; * 1) MASM EXCMD;
; * 2) LINK EXCMD;
; *    Disregard the error message stating that there was
; *    no stack segment.
; * 3) EXE2BIN EXCMD EXCMD.COM
; * 4) Delete the resulting OBJ and EXE files.
; *
; *
; *****
WriteString = 09H ;Write string to standard output
SetBlock = 4AH ;Set memory block to requested size
ExitFunction = 4CH ;Terminate a process w/return code
DosCall = 21H ;DOS command function processor
ExecInt = 2EH ;Entry point into primary COMMAND.COM
; *****

; *
; * MAIN CODE BODY
; *
; *****
CODE SEGMENT PARA 'CODE'
ASSUME DS:CODE, CS:CODE, ES:NOTHING, SS:CODE

ORG 0080H
PSP_Count DB ?
PSP_String DB 127 DUP(?)

EXCMD PROC NEAR

MOV AH,PSP_Count
OR AH,AH ;Test for command tail present
JZ CantExecute ;Must have a command tail

MOV BX,OFFSET LastByte ;Get last byte address
SHR BX,1
SHR BX,1
SHR BX,1
SHR BX,1 ;Divide by 16 for paragraphs
INC BX ;Add 1 for partial paragraph
MOV AH,SetBlock ;Function to shrink memory
INT DosCall
JC FatalError ;Fatal memory allocation error

MOV WORD PTR StackPtr,SP ;Save stack pointer
MOV WORD PTR StackSeg,SS ;and the segment register
MOV SI,OFFSET PSP_String ;Point to command tail string
INT ExecInt ;Call primary COMMAND.COM
MOV SP,WORD PTR CS:StackPtr ;Restore Stack Pointer
MOV SS,WORD PTR CS:StackSeg ;and segment register

MOV AH,ExitFunction ;Return to DOS
XOR AL,AL ;Set error code zero
INT DosCall

FatalError:
MOV AH,WriteString ;Set DOS function code
MOV DX,OFFSET Error1Msg ;Point to string
INT DosCall
MOV AH,ExitFunction ;Return to DOS with an "errorlevel"
MOV AL,1 ;code set
INT DosCall

CantExecute:
MOV AH,WriteString ;Set DOS function code
MOV DX,OFFSET Error2Msg ;Point to string
INT DosCall
MOV AH,ExitFunction ;Return to DOS with an "errorlevel"
MOV AL,1 ;code set
INT DosCall

EXCMD ENDP

Error1Msg DB 7,7,'EXCMD - Fatal memory allocation error!',13,10,'$'
Error2Msg DB 7,7,'EXCMD - Command string required',13,10
DB 'Command execution aborted!',13,10,'$'

StackSeg DW ?
StackPtr DW ?

LastByte EQU $ ;Last byte of program + 1

CODE ENDS

END EXCMD

```

End



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Computers and printers have come a long way since then. Word processing is now a popular application. Commercial word processors abound, and a number of public-domain (PD) word processors rival the better commercial versions. I'll describe many of the MS-DOS PD word processors this month. Most are user-supported—also referred to as freeware or shareware. This means that, if you find the program useful, you are expected to make a donation to the author. See my April 1987 Public Works column (p. 122) for more information on user-supported software.

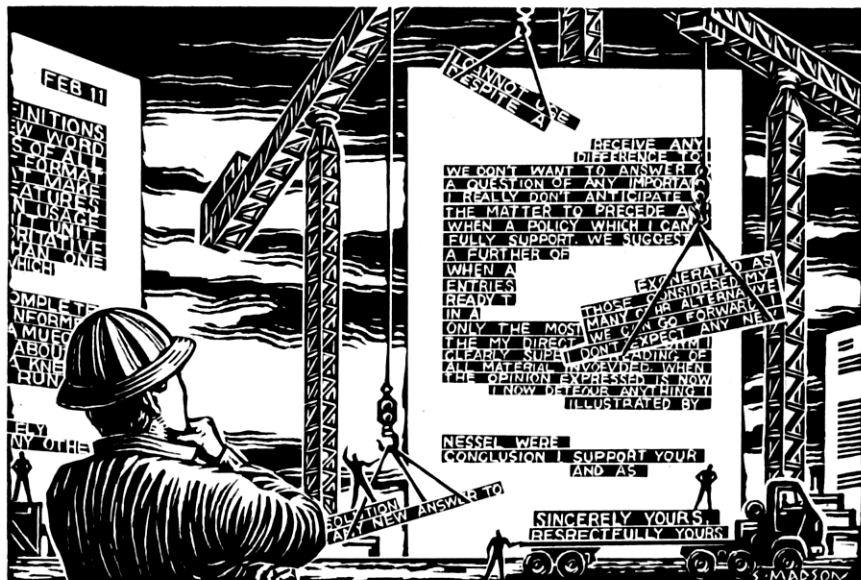
PC-Write

One of the more successful user-supported word processors is PC-Write. It is so successful that its author, Bob Wallace, has founded a company, Quicksoft Inc., to provide support to paid users and to improve PC-Write. This product has been updated many times since its beginning in 1983. The most recent version is 2.71. PC-Write is commonly found on bulletin-board systems (BBSes) around the country, though some do not have the latest version. It's hard to keep up with a program that has been revised so many times.

PC-Write includes an on-line spelling checker and dictionary. Other PD word processors also have this feature, but PC-Write's spelling checker works as you type. If you type a word that is not in its dictionary, PC-Write signals you with a beep. You can then either correct the spelling or add the word to an auxiliary dictionary.

Though the spelling checker is not the best in the world, it is sufficient for most tasks. If you want a better spelling checker, you can install Borland International's Turbo Lightning, a commercial spelling checker and thesaurus. Instructions for doing so are in the manual provided to contributing users.

PC-Write has probably the most extensive and easiest-to-use help utilities of all the PD word processors. These utilities



A number of PD word processors rival the commercial versions.

cover 45 topics ranging from the basics of using the program to footnoting, referencing, inserting headers and footers, and operating the spelling checker. They also tell you what you get for being a supporting user and provide a phone number to call for help. While most of Quicksoft's support service is for registered users, unregistered users may call for help getting started.

Quicksoft's main source of income comes from the extra support it provides. To start, you can buy the two program disks for trial from Quicksoft for \$16. These disks include the full program and instructions, which you print out with a special program provided. If you like the program, you can then either buy the printed hard-bound manual for \$45 or, as they say it, "really buy" PC-Write for \$89, which covers registration.

The 350-page manual is professionally done. For your \$89 you also get telephone

support for one year, a quarterly newsletter, two free updates with disks and upgrade notes, and a \$25 commission when someone else registers and gives the registration number from your disk.

PC-Write is easy to use and learn, making it good for beginners.

PC-Type +

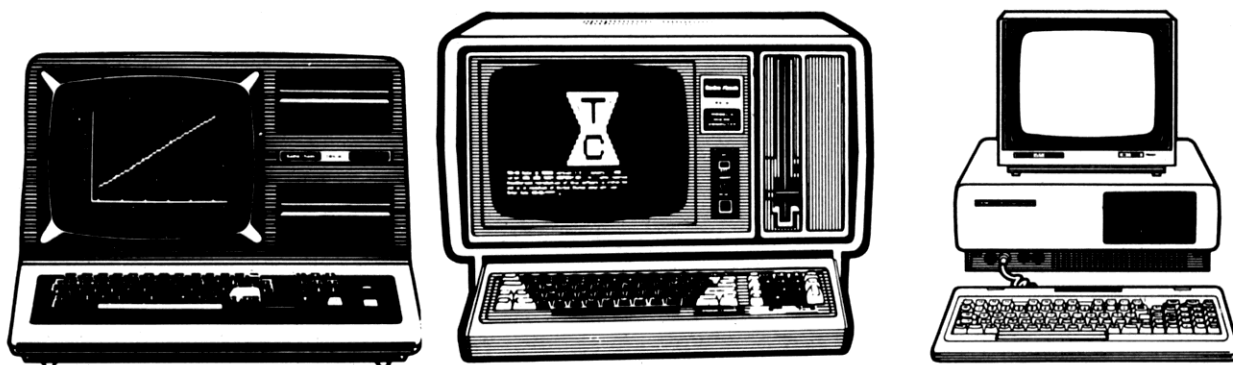
Another prominent shareware author is Jim Button. Along with the late Andrew Fluegelman, who wrote PC-Talk and coined the term "freeware," he pioneered the user-supported concept. Jim is the founder of a company called Buttonware, which produces and distributes shareware programs that he and others wrote. One program distributed through Buttonware is a word processor called PC-Type +.

Buttonware's philosophy is to give the user the complete program and instructions, but to hold back on fully describing some of the more sophisticated features. When you register for PC-Type + by paying \$69.95, you receive a 300-page manual, update notification, the latest version of the program, more detailed help disks, and a year of technical support.

The PC-Type + disk has three levels of help files. The first level uses screen help files that you call from within the program with the F1 key. The second level is a menu of 14 help files that you can



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select. In the third level, you select help on one of 64 topics.

PC-Type+ has no instruction manual on disk; you must become adept at using the help files. The help files are cumbersome and require guesswork to figure out how to access them.

The program and over 750K of supporting files reside on three disks. Most of the files are overlays and aren't resident while the program runs. A 20-megabyte hard drive is almost a necessity when using this program.

PC-Type+ has its own spelling checker and 100,000-word dictionary, but it does not check spelling as you type as does PC-Write. PC-Type+ does not guess which word you meant to type when it finds one not in its dictionary. PC-Write has this option, but it leaves a lot to be desired. PCMerge, a program to mail-merge files, and PCLabels, a program to print address labels, also come with PC-Type+.

New York Word

A lot of people in my area think that New York Word (NYW), written by Marc Adler, is a good word processor. NYW is a spin-off from a Unix word processor of the same name sold commercially by the author. NYW (version 2.1) not only has its own spelling checker and dictionary, but an automatic-hyphenation option, as well. For those of you who are interested, this option's code uses a cross between the Knuth automatic-hyphenation algorithm and the Gimpel algorithm. The spelling checker has a bug: It doesn't recognize misspelled words that end a sentence. It apparently considers words that end in a period as abbreviations.

NYW also has two calculator modes and can do limited graphics using ASCII line-drawing characters.

Though not as easy to use as PC-Write, NYW is much simpler than PC-Type+. Its on-line help files are easier to access than PC-Type+'s and more extensive than PC-Write's. Learning NYW's commands is probably harder than with PC-Write. If you are familiar with Wordstar, you can configure many of the keys to replicate the Wordstar commands. NYW has a set of utilities that can reconfigure keys to practically any one- or two-key combination. A file is already set up to configure to Wordstar. Another notable feature is the ability to generate a table of contents and an index.

Other than the help files, no instructions are provided on the disk. Registered owners (those who send a donation) receive a 100-page manual. The requested donation is \$35. Registered users also receive mail-merge and label programs. Considering the price, NYW is an excellent value.

Wordplan

One of the newer word processors on the PD scene (version A.00.00) is Wordplan from DEA Software. Public Brand Software (P.O. Box 51315, Indianapolis, IN 46251, 800-426-3475), one of the distributors I wrote about last month, sent it to me. Public Brand gives Wordplan its highest rating: four stars and a trophy symbol meaning tremendous.

New York Word is a spin-off from a Unix commercial word processor.

Actually, DEA calls its word processor a "decision-support system generator." It has extensive math capabilities that are programmed into the text you create. Wordplan can even read 1-2-3 spreadsheet information directly from the spreadsheet file and print out tabulations and totals in a final report. There is no need to cut and paste information from the spreadsheet. DEA requests a \$49.95 donation.

An internal modeling language within Wordplan determines which information from the spreadsheet is pertinent and makes the calculations for you. When you update the information in the spread-

sheet, just call it from the Wordplan script that you create. It can also read files from the PD spreadsheet, As-Easy-As, or any DIF file such as from Dbase.

Wordplan does not have an on-line help feature, but you can implement many commands through pull-down menus much like those of Ashton-Tate's Framework II. A script file lets you print out a documentation file using Wordplan. Wordplan's editor is a modified version of Microstar from the Turbo Editor Toolbox by Borland.

Most of the commands are easy to use if you understand Wordstar. Wordplan does not have a spelling checker, though you can interface it with Borland's Turbo Lightning. Though Wordplan is itself a word processor, its documentation states that it can work well with PC-Write. You are probably better off using one of the other word processors if your word-processing needs are simple. Wordplan is best left to its intended special applications and is not for the faint of heart. I'm glad that I had the chance to use Wordplan, though. Its applications are unique.

Next Month

I've covered only the more sophisticated word processors this month. Next month I'll describe a few simpler programs and survey a few word-processing support programs in the public domain. I'll even tell you about a word processor for kids.

As a convenience, I am again offering disks for 80 Micro readers. The cost is \$10 each for PC-Write, PC-Type+, and New York Word disk sets. If you send for more than one disk, just send \$5 per disk and no extra shipping. Please don't ask for anything other than what I offer. It will delay things tremendously. If you want to write me, please do so separately.

Wordplan has a limited distribution system that precludes me offering a disk, though it is on the 80 Micro BBS. You can order a disk from Public Brand Software (disk no. WP10.0) or the author for \$10.

All PD software discussed in the Public Works column is available for downloading from the 80 Micro BBS for a period of time at 603-924-6985 (300/1,200 baud, 8-bit words, no parity, 1 stop bit). ■

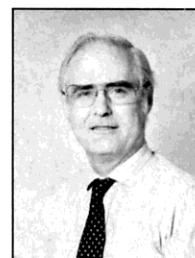
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Table 1. User-supported word processors and where to get them.



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type styles for print quality that rivals a daisy wheel. In the draft mode, the DMP 2110 (26-2810, \$1295) prints up to 240 characters per second.

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The DMP 430 (26-1277, \$699) allows a choice of micro, italic and double-high fonts, as well as bit-image graphics. Prints up to 180 characters per second.

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The DWP 520 daisy-wheel printer (26-2800, \$995) provides a clean, crisp, "electric-typewriter" look at up to 500 words per minute.

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Pop-Up Printer Codes with Pro-Wam

Your printer probably has several features that you rarely use—the ability to double-strike or emphasize characters, change fonts or font sizes, or change line spacing, for example. Printers require a sequence of control codes to perform such feats, and unless you are in Basic or using a word processor, it is difficult to send those codes to the printer.

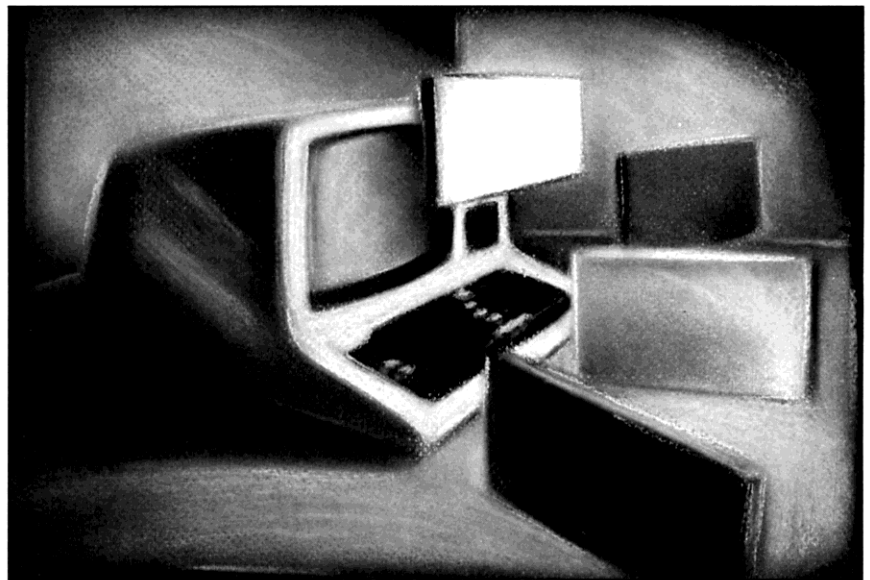
I wanted a program that could access many of my printer's features. I wanted to select those options from TRSDOS Ready, from inside a text editor, or while using other programs. My printer-setup program should remember the codes necessary to select various printer features and let me redefine control-code sequences at any time.

This month's demonstration program comes very close to meeting those requirements and gives me a chance to discuss a number of techniques that I have not mentioned here before.

Although you can use many of the ideas in this month's program regardless of what software you own, it only runs as written with one of the most remarkable Model 4 programs I've seen: Misosys's Pro-Wam (formerly Pronto).

Pro-Wam is a set of pop-up utilities that are always available with a single keystroke. Pro-Wam allows an unlimited number of pop-up utilities, four of which you can designate to be available with two keystrokes. You can run the other utilities from disk.

Pro-Wam supports user-written, pop-up utilities for the assembly-language programmer. Its documentation tells you how to write your own utility applications, and this month's program demonstrates many of the necessary techniques. You can also make calls to the Pro-Wam window manager from pro-



grams written in any language; the extensions to Basic in LS-DOS 6.3 combined with Pro-Wam make windowed Basic programs easy to write.

Pro-Wam includes a utility that makes debugging pop-up utilities easier and a file containing macro commands for all of its calls.

Designing an Application

A Pro-Wam pop-up utility (or application, as it is called in the program's documentation) must conform to the following restrictions.

- You must write the program to run in the memory area from 2800–2FFF hexadecimal (hex).
- The program can use any or all of the memory space from 2400–2FFF hex as data space.
- You must save the program as a core-image file, which means that it cannot contain any TRSDOS loading codes.
- The first sector of the program file must contain specific information as a Pro-Wam signature.

The Pro-Create or MRAS assemblers can handle most of these details without difficulty. Program Listing 1 begins by loading the macro commands in both MACLIB/ASM (see Program Listing 2) and Pro-Wam's Window/Mac file. It then establishes four constants that define its

screen window. SRow and SCOL are the starting row and column for the window; NRow and NCOL define the window's total number of rows and columns.

Pro-Wam places a border around the window when it loads. It saves the screen contents and restores the screen and cursor position when it is finished.

The OPTION CI in line 320 of Listing 1 tells the assembler to create a core-image file (the same as a memory dump) instead of a normal CMD file with loader information. You could specify the assembler switch when assembling the program, but it is easier to place the command in the source code than to remember to specify it each time you assemble the listing.

Erases Old Responses

A program-specific macro command that prints prompts and information in the application window starts in line 340. Each time you invoke the macro, it copies a buffer from memory to the screen, erasing old prompts and responses, then prints the new information on a specified line of the application window.

The program starts on line 430 with the definition of the information sector that must precede every Pro-Wam application. The first six characters must be PRONTO, the next 12 characters must describe the application for the Pro-Wam

System Requirements

Model 4, 4P, or 4D

128K RAM

Editor/assembler

(Pro-Create 4.3a or MRAS)

**Available on The Disk Series
Pro-Wam**

main menu, and the 19th character must be ETX, which terminates strings in TRSDOS programs when you do not want a carriage return. The program reserves the following 205 bytes for expansion. You can use the final 32 bytes of the information sector for invisible copy-right information.

The program asks the assembler to use the expression in line 460 to count the bytes that should remain blank. In English, that line says, "Pad the rest of this sector with bytes of zero." The expression following the DC (define constant bytes) pseudo-op is not difficult to understand. It uses the current value of the program counter (the dollar sign [\$]) and simple arithmetic to determine how many more bytes there are in the first sector of the program. Line 500 tests the result to ensure that the expression was written and evaluated correctly.

The program code begins at the Start label in line 530. The @WCreate macro creates a Pro-Wam window, if possible. If it cannot create the window, the program sends a beep through the Model 4's built-in speaker and then exits. Otherwise, it calls the Make_DISP routine to create a copy of the window display in a memory buffer. Any time the program wants to clear prompts or user responses from the screen, it simply asks Pro-Wam to copy that buffer back into its screen window.

The Main Loop Repeats Indefinitely

The main loop, lines 630-730, repeats until you want to exit the program. The loop asks you to press either "P" to send a control sequence to the printer or "D" to define or redefine a control sequence. If you press break while that prompt is on the screen, the program ends and writes any new information back to its file on disk. The main loop repeats indefinitely until you press break.

The rest of the program is a series of subroutines that perform most of the work. The first routine, Make_DISP, converts the current information in the program's data sector into a form that you can understand. Listing 1 stores information for 15 printer-control sequences. It stores each sequence as a nine-character identification string followed by up to eight bytes of printer-control characters.

Make_DISP creates a window buffer in memory, clears the buffer, and places each of the printer codes in that buffer. As it does so, it must change the bytes of the printer-control sequences into ASCII hex values. Invoking the @HEX8 supervisory call (SVC) in TRSDOS makes the job easier.

The program calls the second routine, Close, when you want to exit. Close's first job is determining whether you re-

Program Listing 1: Printer-setup application.

```

00100 ;=====
00110 ;   Printer Setup Application
00120 ;   Requires PRO-WAM (formerly PRO-NT0) from Misisys
00130 ;
00140 ;   Assemble as PRSET/APP
00150 ;=====
00160 ;
00170 *LIST OFF
00180 *GET  MACLIB/ASM           ;See Listing 2
00190 *GET  WINDOW/MAC        ;Supplied with PRO-WAM
00200 *LIST ON
00210 ;
00220 SROW  EQU    3
00230 SCOL  EQU    43
00240 NROW  EQU    20
00250 NCOL  EQU    36
00260 ;
00270 EREOL  EQU    1EH        ;Erase to end of line
00280 ETX    EQU    3
00290 CR     EQU    13
00300 LF     EQU    10
00310 ;
00320 OPTION CI                ;Must be core image file
00330 ;
00340 PROMPT MACRO #STRING,#ROW ;Print prompt on bottom line
00350 @WB2W DISP ;Reset screen
00360 @WSCUR #ROW,0 ;Cursor to beginning of bottom row
00370 @WDSPLY #STRING ;Display string
00380 ENDM
00390 ;
00400 ;-----
00410 ;   Information Sector
00420 ;-----
00430 ORG    2700H             ;Forces start to 2800h
00440 DB    'PRNTO'           ;File identifier
00450 DB    'Set Printer ',ETX
00460 DC    .HIGH.$<8-$+256,0 ;Pad sector
00470 ;-----
00480 ;   Application starts here at 2800h
00490 ;-----
00500 IFNE    $,2800H           ;Test location
00510 ERR    'Something is wrong in the header'
00520 ENDIF
00530 START:
00540 @WCREAT SROW,SCOL,NROW,NCOL
00550 JR     Z,OKAY             ;If window open, begin
00560 @ESOUND 0,2               ;Beep if not okay
00570 RET ; and leave
00580 OKAY  CALL  MAKE_DISP     ;Create window display in memory
00590 ;-----
00600 ;   Loop until user
00610 ;   wants out
00620 ;-----
00630 LOOP  PROMPT  MAIN_PRMT,NROW-1 ;Get user response
00640 @WKEYIN 0 ;Get user response
00650 JP     C,CLOSE ;Go if <Break> pressed
00660 AND    0DFH ;For letter to upper case
00670 PUSH  AF ;Save response
00680 CP    'P' ;Send string to printer?
00690 CALL  Z,PRINT ;Yes -- go
00700 POP   AF ;Recover response
00710 CP    'D' ;Define a string?
00720 CALL  Z,S_DEFINE ;Yes -- go
00730 JR     LOOP ;Loop back and do it again
00740 ;-----
00750 ;   Create ASCII display
00760 ;   in PRO-WAM data area
00770 ;-----
00780 MAKE_DISP:
00790 MEMFILL DISP,NROW*NCOL,' ' ;Clear display area
00800 MOVE  TITLE,DISP,TITLE_LEN ;Move title to display area
00810 LD    HL,NCOL*2+DISP ;HL ==> 3rd line
00820 LD    DE,DEF ;DE ==> definitions
00830 LD    B,15 ;15 strings max
00840 LD    A,'A' ;ID of first string
00850 LD    (LETR$),A ;Save it
00860 MD_1 PUSH  BC ;Keep loop counter
00870 LD    A,(LETR$) ;Get display letter
00880 LD    (HL),A ;Place the ID character
00890 INC  A ;Next ID character
00900 LD    (LETR$),A ;Save next one
00910 INC  HL ;Point to next location
00920 LD    (HL), '.' ;Print period
00930 INC  HL ;Point to next
00940 INC  HL ;Skip a space
00950 EX  DE,HL ;Exchange pointers
00960 LD    BC,9 ;Nine characters in name
00970 LDIR ;Move nine characters
00980 EX  DE,HL ;HL==> next space, DE==> hex data
00990 LD    B,8 ;8 data bytes
01000 MD_2 PUSH  BC ;Save loop counter
01010 INC  HL ;Skip a space
01020 LD    A,(DE) ;Get data byte
01030 OR    A ;Is it 0?
01040 JR    Z,MD_4 ;Yes -- go
01050 LD    C,A ;Else byte in C
01060 @HEX8 ;Convert to ASCII hex
01070 MD_3 POP   BC ;Get loop counter

```

Listing 1 continued

Listing 1 continued

```

01080      INC      DE      ;Bump pointer
01090      DJNZ     MD_2     ;Loop for all bytes
01100      JR       MD_5     ;Complete outer loop
01110 MD_4      INC      HL      ;If 0, leave spaces
01120      INC      HL
01130      JR       MD_3     ;Complete inner loop
01140 MD_5      POP      BC      ;Recover outer loop counter
01150      DJNZ     MD_1     ;And loop for all strings
01160      RET
01170 ;-----
01180 ; Close up, save new definitions
01190 ;-----
01200 CLOSE LD      A,(CHANGES) ;Did user change definitions?
01210      OR      A ;Test if 0
01220      JR      Z,CL_3 ;No changes made -- leave program
01230      @@FSPEC  PROGNAM,FCB ;Set up FCB for open
01240      DEFINE   @OPEN,3BH ;Handle OPEN directly to trap
01250      LD      HL,DEF ;Point to buffer
01260      LD      B,0 ;LRL = 256
01270      SVC     @OPEN ;Open the file
01280      JR      Z,CL_2 ;Go if no error
01290      PROMPT  OPEN_ERR,NROW-2 ;Else report error
01300 CL_1      @WKEYIN 0 ;Wait for keystroke
01310      JP      C,LOOP ;Main loop if <Break>
01320      AND     @DFH ;Else make upper-case
01330      CP      'N' ;Don't quit?
01340      JP      Z,LOOP ;Then return to main loop
01350      CP      'Y' ;Do quit?
01360      JR      Z,CL_3 ;Then leave program
01370      JR      CL_1 ;Else wait for correct response
01380 CL_2      @@POSN  DATSEC ;Position record to data
01390      @@WRITE ;Write data to disk
01400      @@CLOSE ;Close the file
01410 CL_3      @WCLOSE ;Close our window
01420      RET ;We're done -- control to PRO-WAM
01430 ;-----
01440 ; Send existing setup
01450 ; string to printer
01460 ;-----
01470 PRINT PROMPT  PRT_PRMT,NROW-1 ;Display prompt message
01480      CALL    SELECT_LINE ;Pick line to print
01490      RET      C ;Go if <Break>
01500      CALL    SEND_PRT ;Else send value to printer
01510      RET ;And leave
01520 ;-----
01530 ; Select line for printing
01540 ; or definition. Return line
01550 ; ID (0 - 14) in A or CF if <Break>
01560 ;-----
01570 SELECT_LINE:
01580      @WKEYIN 0 ;Get one keystroke
01590      RET      C ;Return if <Break>
01600      AND     @DFH ;Force to upper-case
01610      IFLT_JR 'A',SELECT_LINE ;Loop if too low
01620      IFGE_JR 'P',SELECT_LINE ;Loop if too high
01630      SUB     'A' ;Make relative to 0
01640      RET
01650 ;-----
01660 ; Send setup string to printer
01670 ;-----
01680 SEND_PRT:
01690      @@MUL16 17,A ;Offset to selected string
01700      LD      H,L ;Shift result
01710      LD      L,A ; to HL
01720      LD      DE,DEF ;DE ==> definitions
01730      ADD     HL,DE ;HL ==> beginning of ID string
01740      LD      DE,9 ;Characters in string
01750      ADD     HL,DE ;HL ==> first data byte
01760      LD      B,8 ;Up to 8 data bytes
01770 SP_1      LD      A,(HL) ;Get byte
01780      INC     HL ;Bump pointer
01790      OR      A ;Is it 0?
01800      JR      Z,SP_2 ;Go if yes
01810      @@PRT A ;Else print character
01820 SP_2      DJNZ     SP_1 ;Loop for all characters
01830      RET
01840 ;-----
01850 ; Define new setup string
01860 ;-----
01870 S_DEFINE:
01880      PROMPT  SEL_PRMT1,NROW-2 ;Ask for string to define
01890      CALL    SELECT_LINE ;Get user response
01900      RET      C ;Return on <Break>
01910      LD      (LETRS),A ;Save response
01920      PROMPT  SEL_PRMT2,NROW-2 ;Ask for ID
01930      MEMFILL IDBUF,10,CR ;Clear ID buffer
01940      @WKEYIN 9,IDBUF ;Get input
01950      JR      C,S_DEFINE ;Loop back if <Break>
01960      LD      A,B ;Get number of characters
01970      OR      A ;Were there any?
01980      JR      Z,S_DEFINE ;Loop if none
01990      MEMFILL HEXBUF,24,0 ;Clear input buf
02000      PROMPT  SEL_PRMT3,NROW-2 ;Ask for hex bytes
02010      @WKEYIN 23,HEXBUF ;Get input
02020      JR      C,S_DEFINE ;Loop back if <Break>
02030      LD      A,B ;Get length of input
02040      OR      A ;Was there any?
02050      JP      Z,S_DEFINE ;No -- loop back
02060      CALL    HEXTEST ;Test input

```

Listing 1 continued

defined any of the control sequences or added any new ones. If you made any changes, Close saves the printer-control data back to disk before returning to Pro-Wam and the program that was running when you invoked Pro-Wam.

There are two ways to save the control information, and each represents a trade-off. If the program saves new control data to a data file, it has to pause to find and read that file whenever you invoke it. On a floppy-based system, you must leave the disk containing the data file in one of the drives at all times.

An Option to Save

In the other option the program saves the control-sequence data into itself, so that the data is available whenever you load the program. This is a handy technique to use for short utilities that need little user-defined data. The program opens the disk copy of itself, finds the appropriate sector, and writes one or more records into itself. The program never loses time looking for a data file when you invoke it, and there is little chance that the data and program files will end up on separate disks.

The disadvantage of the latter method is that Pro-Wam keeps a copy of four selected programs in a back bank of memory. It cannot know that you altered one of those programs, and will not display the new data the next time that you invoke it, unless you reboot or remove Pro-Wam from memory and reload it with its associated files.

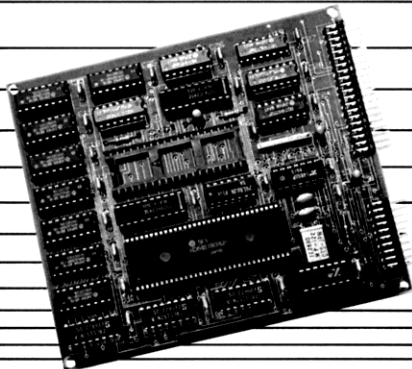
Speedy but Inconvenient

In spite of this inconvenience, I chose to implement Listing 1 using the second strategy. I found that once I defined my printer's most common control sequences, I seldom wanted to alter any of them. I appreciate the program's speed (it never has to look for a data file) more than I dislike the inconvenience of having to remove and reload Pro-Wam whenever I want to preserve new control-sequence definitions.

If the Close routine finds that you changed any definitions, it tries to open PRSET/APP (the filespec I use for the application program). If the open operation is successful, Close positions the file to the last sector (which is where the data resides) and writes the new contents of the data area into that sector. If the open operation is unsuccessful, the program reports an error and lets you decide whether to end anyway or return to the main loop (and perhaps load the disk containing PRSET/APP into one of the computer's drives). The program ends by telling Pro-Wam to close its window and then returns control to Pro-Wam.

Most of the remaining routines are

4, 4D, 4P



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THE NEXT STEP

Listing 1 continued

```

02070      JP      C,S_DEFINE
02080      CALL   XFER_STRING
02090      CALL   MAKE_DISP
02100      LD      A,-1
02110      LD      (CHANGES),A
02120      RET
02130      ;-----
02140      ; Test hex input for correct form
02150      ;-----
02160      HEXTEST LD      HL,HEXBUF
02170      HEX_1  CALL   ISHEX
02180      RET      C
02190      CALL   ISHEX
02200      RET      C
02210      LD      A,(HL)
02220      IFEQ_JR CR,HEXOKAY
02230      CALL   ISSEP
02240      RET      C
02250      LD      A,(HL)
02260      IFNE_JR CR,HEX_1
02270      HEXOKAY XOR      A
02280      RET
02290      ;-----
02300      ; Test if (HL) is a valid hex
02310      ; character.
02320      ; If okay -- reset CF and inc HL
02330      ; If not okay, set CF
02340      ;-----
02350      ISHEX  LD      A,(HL)
02360      CP      '0'
02370      RET      C
02380      CP      '9'+1
02390      JR      C,ISH_OK
02400      AND      0DFH
02410      LD      (HL),A
02420      CP      'A'
02430      RET      C
02440      CP      'F'+1
02450      ISH_OK CCF
02460      RET      C
02470      INC      HL
02480      RET
02490      ;-----
02500      ; Test if (HL) is a valid
02510      ; separator (' ' <-> '/')
02520      ; Set CF is not, else convert
02530      ; to ' ', reset CF, and inc HL
02540      ;-----
02550      ISSEP  LD      A,(HL)
02560      CP      ' '
02570      RET      C
02580      CP      '/' + 1
02590      CCF
02600      RET      C
02610      LD      A,' '
02620      LD      (HL),A
02630      INC      HL
02640      RET
02650      ;-----
02660      ; Move new user data into the DEF area
02670      ;-----
02680      XFER_STRING:
02690      LD      HL,IDBUF
02700      PUSH   HL
02710      LD      B,9
02720      XFER_1 LD      A,(HL)
02730      IFNE_JR CR,XFER_2
02740      LD      (HL),' '
02750      XFER_2 INC      HL
02760      DJNZ   XFER_1
02770      LD      A,(LETR$)
02780      @MUL16 17,A
02790      LD      H,L
02800      LD      L,A
02810      LD      DE,DEF
02820      ADD     HL,DE
02830      EX      DE,HL
02840      LD      BC,9
02850      POP     HL
02860      LDIR
02870      LD      B,8
02880      LD      HL,HEXBUF
02890      XFER_3 LD      A,(HL)
02900      INC      HL
02910      IFEQ_JR ' ',XFER_3
02920      IFEQ_JR CR,XFER_4
02930      PUSH   BC
02940      SUB     '0'
02950      CP      10
02960      JR      C,$+4
02970      SUB     7
02980      SLA     A
02990      SLA     A
03000      SLA     A
03010      SLA     A
03020      LD      C,A
03030      LD      A,(HL)
03040      INC      HL
03050      SUB     '0'

;Loop back if not okay
;Move id and hex string
;Make new display
;Value for change flag
;Store flag to show change
;And return

;HL ==> hex input buffer
;Is first character hex?
;Go if not
;Is next character hex?
;Go if not
;Get next character
;Go if at end
;Valid separator?
;Go if not
;Get next character
;Loop back if not end
;Clear carry flag
;We're done

;get character
;Special chacter?
;Go if < 0
;Is it decimal?
;Go if okay
;Force a-f to A-F
;And put it back
;Between 3B and 40 hex?
;Yes -- go
;Above 46h?
;Reverse carry flag
;Return if error
;Else bump pointer
;And return

;Get character
;Too low?
;Yes -- return
;Over the top?
;Reverse carry flag
;Return if not legal
;Else get a space
;Convert character to space
;Point to next char.

;Point to ASCII buffer
;Save address
;Size of ID string
;Get character
;Go if not CR
;Else replace with ' '
;Point to next character
;Loop for all 9 characters
;Get string we're working with
;Multiply by entry length
;Shift result
; to HL
;DE ==> definitions area
;HL ==> string space
;Move pointer to DE
;Size of ID string
;Get pointer
;Move it all
;Max number of entries
;HL ==> hex input buffer
;Get character
;Bump pointer
;Get next if a space
;Go if at end
;Else save counter
;Convert to binary
;Is it 0 - 9 ?
;Yes -- skip next instruction
;Else convert A - F
;Multiply by 16

;Store in C
;Get next character
;Bump pointer
;Convert to binary

```

Listing 1 continued

THE NEXT STEP

short and easy to understand. Print (lines 1470–1510) asks which control sequence you want to print and then calls a second subroutine (Select_Line) to send that sequence to the printer.

Select_Line waits for you to type a character that selects one of the 15 possible printer codes and then returns that value to the routine that called it. Another subroutine, Send_PRT, finds the selected printer-control bytes in memory and sends them to the printer, skipping over any zero bytes in the process.

The S_Define routine lets you define a control sequence. S_Define asks you which of the 15 sequences you want re-defined and prompts for both a nine-character title and eight hex bytes. You type in each byte as two hex digits followed by a space or other separator. (The legal separators are any ASCII characters less than zero—the same separators that TRSDOS allows for a log-on date.)

After you enter the new information, S_Define calls Make_Disp to create a new display buffer in memory, and sets the Change\$ flag byte to indicate that you made a change. If you press break to avoid defining a new control sequence, you will not alter the display buffer or the Change\$ byte.

S_Define calls a routine called Hextest, which calls two shorter routines, scans through the list of control bytes that you typed in and verifies that each is either a valid hex digit or a valid separator. If it finds an invalid character, Hextest returns with the carry flag set to indicate an operator error.

The last long routine, XFER_String, stores your new definition in the data area in a form that you can copy back to disk. The only difficult part of this routine is the code that converts ASCII hex into bytes (TRSDOS has no SVC to make the conversion). When the XFER_String routine finds the carriage return at the end of your input, it pads the remainder of the identification string with spaces and the remainder of the printer-control sequence with zero bytes.

The Data Sections

Pro-Wam's set of macros includes a command called \$DS. \$DS defines space inside the data area from 2700–27FF hex. Listing 1, however, requires more data space than that. The label that \$DS uses, Data\$, initializes to the very beginning of the data area (2400 hex).

The \$DS macro assigns each of the temporary values space in the data area. At the end of that data section, it checks Data\$ to ensure that the program has not overflowed the data area.

The second set of data definitions includes various messages and the

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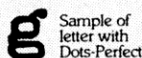
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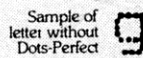
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THE NEXT STEP

Change\$ flag, which you must initialize to zero (no change). There is nothing unusual about these definitions.

The last section of the data area is unusual. Padding the program with zero bytes moves the program counter to an even page and sector boundary. The program calculates which will be the final sector, knowing that its first sector loads at 2700 hex. Finally, the REPT macro initializes 15 sequences of nine spaces and eight zero bytes.

This technique of defining data at the end of a program doesn't work the same way for most CMD programs. The source code has no control over the loader information required in a TRSDOS program file. The technique only works for programs that you can save as core-image files without loader codes.

Debugging and Using the Program

When you finish assembling the program, test it and, if necessary, debug it using the PRun utility included with Pro-Wam. Load Pro-Wam into memory and then enter PRUN PRSET to test the program. It should run normally, let you define printer sequences, and send those sequences to your printer.

If the program doesn't work, enter PRUN PRSET (D) to run the program under Debug.

When you are sure the program works correctly, add it to the set of four programs that Pro-Wam loads automatically. When you define a new set of control codes, the program first expects an identification string of nine or fewer characters and then expects you to enter the hex control codes in a specific form. You must follow each two-character hex byte with a space or other separator. If you omit the separators, the program rejects your entry and asks you to enter the control codes again.

If you want to remove a definition from the list, enter a single space as the identification string and 00 as the hex sequence. The program interprets this as a command to erase the previous printer code.

Pro-Wam is available from Misosys Inc., P.O. Box 239, Sterlind, VA 22170-0239, 800-647-6797, for \$59.95. ■



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THE NEXT STEP

Listing 1 continued

```

03060 CP 10 ;Is it 0 - 9
03070 JR C,$+4 ;Yes -- skip next
03080 SUB 7 ;Else convert A - F
03090 ADD A,C ;Merge in first byte
03100 LD (DE),A ;Save value
03110 INC DE ;Bump pointer
03120 POP BC ;Recover count
03130 DJNZ XFER_3 ;And loop back
03140 LD A,0 ;Pad with 0 bytes
03150 LD (DE),A ;Save it
03160 INC DE ;Bump pointer
03170 DJNZ XFER_4 ;And loop back till done
03180 RET
03190 ;-----
03200 ; Data definitions
03210 ;-----
03220 DATA$ DEFL 2400H ;Set DATA$ to beginning of data area
03230 SDS FCB,32 ;Put in PRO-WAM data area
03240 DISPLEN EQU NROW*NCOL
03250 SDS DISP,DISPLEN
03260 SDS LETTR$,1
03270 SDS IDBUF,10
03280 SDS HEXBUF,24
03290 IFGT DATA$,27FFH
03300 OVER DW DATA$
03310 ERR DATA AREA OVERFLOW
03320 ENDIF
03330 TITLE DB ' Printer Setup Application'
03340 TITLE_LEN EQU $-TITLE
03350 PROGRAM DB 'PRSET/APP',0
03360 MAIN_PRMT DB '<P>printer setup or <D>efine -->',ETX
03370 PRT_PRMT DB 'Print which sequence (A-O) -->',ETX
03380 SEL_PRMT1 DB 'Define which sequence (A-O) -->',ETX
03390 SEL_PRMT2 DB 'Description -->',ETX
03400 SEL_PRMT3 DB 'Hex sequence -->',CR
03410 OPEN_ERR DB 'Cannot open PRSET/APP to save ',LF
03420 DB 'new data. Quit anyway (y/n) -->',ETX
03430 CHANGES DB 0 ;No changes yet
03440 ;-----
03450 ; Force to next sector
03460 ;-----
03470 DC .HIGH,$.SHL.8-$+256,0
03480 IFGT $,2DFFH
03490 ERR 'Program is too long'
03500 ENDIF
03510 DATSEC EQU .HIGH,$-27H ;Sector holding DEF
03520 DEF REPT 15
03530 DC 9,' ' ;9 characters for each seq.
03540 DC 8,0 ;8 bytes for each seq.
03550 ENDM
03560 END

```

End

Program Listing 2: Macro commands for Listing 1.

```

00100 ;-----
00110 ; Macro Commands Used with PRSET/APP
00120 ;-----
00130 ; Name this file Maclib/Asm or add new
00140 ; macros to your own Maclib/Asm file
00150 ;-----
00160 ;-----
00170 ; @@CLOSE -- Close a file or device
00180 ; #FCB defaults to value in DE
00190 ; AF is altered
00200 ;-----
00210 @@CLOSE MACRO #FCB
00220 DEFINE @CLOSE,3CH
00230 IFEQ %%,1
00240 PUSH DE
00250 LD DE,#FCB
00260 ENDIF
00270 SVC @CLOSE,CHECK
00280 IFEQ %%,1
00290 POP DE
00300 ENDIF
00310 ENDM
00320 ;-----
00330 ;-----
00340 ; DEFINE -- Define a label unless it
00350 ; is already defined.
00360 ;-----
00370 DEFINE MACRO #LABEL,#VALUE
00380 IFNDEF #LABEL
00390 #LABEL EQU #VALUE
00400 ENDIF
00410 ENDM
00420 ;-----
00430 ;-----
00440 ; @FSPEC -- Move filespec or devspec
00450 ; to an FCB or DCB
00460 ; Test Z / NZ after using!
00470 ; #Fname and #FCB are both required.
00480 ; If #Fname is already in HL, use HL as filename
00490 ; DE is set to #FCB
00500 ; AF is altered.
00510 ;-----
00520 @FSPEC MACRO #FNAME,#FCB
00530 DEFINE @FSPEC,4EH

```

Listing 2 continued

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Listing 2 continued

```

00540      RPUSH      BC,HL
00550      IFN$      #FNAME,HL
00560      LD         HL,#FNAME
00570      ENDIF
00580      LD         DE,#FCB
00590      SVC       @FSPEC
00600      RPOP       HL,BC
00610      ENDM
00620 ;
00630 ;-----
00640 ; @HEX8 -- Convert 1 byte to ASCII Hex
00650 ; #Byte defaults to value in C
00660 ; #Buf defaults to value in HL
00670 ;-----
00680 @HEX8 MACRO     #BYTE,#BUF
00690      DEFINE     @HEX8,62H
00700      IFGT      %,0
00710      PUSH      BC
00720      LD        A,#BYTE
00730      LD        C,A
00740      ENDIF
00750      IFEQ      %,2
00760      PUSH      HL
00770      LD        HL,#BUF
00780      ENDIF
00790      SVC       @HEX8
00800      IFGT      %,0
00810      IFEQ      %,2
00820      POP       HL
00830      ENDIF
00840      POP       BC
00850      ENDIF
00860      ENDM
00870 ;
00880 ;-----
00890 ; IFEQ_JR -- Performs a JR if A = #Value
00900 ;-----
00910 IFEQ_JR MACRO     #VALUE,#JUMP
00920      CP        #VALUE
00930      JR        Z,#JUMP
00940      ENDM
00950 ;
00960 ;-----
00970 ; IFGE_JR -- Performs a JR if A >= #Value
00980 ;-----
00990 IFGE_JR MACRO     #VALUE,#JUMP
01000      CP        #VALUE
01010      JR        NC,#JUMP
01020      ENDM
01030 ;
01040 ;-----
01050 ; IFLT_JR -- Performs a JR if A < #Value
01060 ;-----
01070 IFLT_JR MACRO     #VALUE,#JUMP
01080      CP        #VALUE
01090      JR        C,#JUMP
01100      ENDM
01110 ;
01120 ;-----
01130 ; IFNE_JR -- Performs a JR if A <> #Value
01140 ;-----
01150 IFNE_JR MACRO     #VALUE,#JUMP
01160      CP        #VALUE
01170      JR        NZ,#JUMP
01180      ENDM
01190 ;
01200 ;-----
01210 ; MEMFILL -- Fill memory with a constant byte
01220 ; All three parameters required
01230 ;-----
01240 MEMFILL MACRO     #ADDR,#LEN,#BYTE
01250      RPUSH      BC,DE,HL
01260      LD         HL,#ADDR
01270      LD         DE,#ADDR+1
01280      LD         BC,#LEN-1
01290      LD         (HL),#BYTE
01300      LDIR
01310      RPOP       HL,DE,BC
01320      ENDM
01330 ;
01340 ;-----
01350 ; MOVE -- Moves a block of memory from
01360 ; #src to #dest. Block is #len bytes long.
01370 ; All three parameters must be specified.
01380 ;-----
01390 MOVE MACRO         #SRC,#DEST,#LEN
01400      IFLT      %,3
01410      ERR       TOO FEW PARAMETERS IN MOVE
01420      ENDIF
01430      RPUSH      BC,DE,HL
01440      LD         BC,#LEN
01450      IFGT      #SRC,#DEST
01460      LD         HL,#SRC
01470      LD         DE,#DEST
01480      LDIR
01490      ELSE
01500      LD         HL,#SRC+#LEN-1
01510      LD         DE,#DEST+#LEN-1
01520      LDDR
01530      ENDIF
01540      RPOP       HL,DE,BC
01550      ENDM
01560 ;
01570 ;-----

```

```

01580 ; @MUL16 -- Multiplies 16-bit by 8-bit value
01590 ; If values aren't specified, defaults to
01600 ; values in HL and C
01610 ; Result in HL and A
01620 ;-----
01630 @MUL16 MACRO     #VAL16,#VAL8
01640      DEFINE     @MUL16,5BH
01650      PUSH      DE
01660      IFEQ      %,2
01670      LD        HL,#VAL16
01680      LD        A,#VAL8
01690      LD        C,A
01700      ENDIF
01710      SVC       @MUL16
01720      POP       DE
01730      ENDM
01740 ;
01750 ;-----
01760 ; @OPEN -- Opens an existing file
01770 ; or device
01780 ; Aborts on all errors except changed LRL
01790 ; #Buffer is required.
01800 ; #LRL defaults to 0 (256)
01810 ; #FCB defaults to current value in DE
01820 ; AF is altered.
01830 ;-----
01840 @OPEN MACRO        #BUFFER,#LRL=0,#FCB
01850      DEFINE        @OPEN,3BH
01860      RPUSH      BC,HL
01870      LD         HL,#BUFFER
01880      LD         B,#LRL
01890      IFEQ      %,3
01900      LD         DE,#FCB
01910      ENDIF
01920      SVC       @OPEN
01930      RPOP       HL,BC
01940      JR        Z,$1?
01950      CP        2AH      ;;Check for LRL change
01960      JR        Z,$1?
01970      LD        C,A      ;;Else error code to C
01980      LD        A,1AH    ;;@ERROR SVC number
01990      RST       28H
02000      $1?      EQU     $
02010      ENDM
02020 ;
02030 ;-----
02040 ; @POSN -- Positions file to record number
02050 ; #REC defaults to value in BC
02060 ; #FCB defaults to value in DE
02070 ;-----
02080 @POSN MACRO        #REC,#FCB
02090      DEFINE        @POSN,42H
02100      IFGT      %,0
02110      IFEQ      %,2
02120      PUSH      DE
02130      LD        DE,#FCB
02140      ENDIF
02150      PUSH      BC
02160      LD        BC,#REC
02170      ENDIF
02180      SVC       @POSN,CHECK
02190      IFGT      %,0
02200      POP       BC
02210      IFEQ      %,2
02220      POP       DE
02230      ENDIF
02240      ENDM
02250 ;
02260 ;-----
02270 ; @PRT -- Send a character to the printer
02280 ; If #CHAR not spcified, default to value in C
02290 ;-----
02300 @PRT MACRO         #CHAR
02310      DEFINE        @PRT,06H
02320      IFEQ      %,1
02330      PUSH      BC
02340      LD        A,#CHAR
02350      LD        C,A
02360      ENDIF
02370      SVC       @PRT
02380      IFEQ      %,1
02390      POP       BC
02400      ENDM
02410 ;
02420 ;-----
02430 ; RPOP
02440 ; Pops 0 to 6 registers from the stack
02450 ; Example: RPOP BC,DE,HL,IX
02460 ;-----
02470 RPOP MACRO         #R1,#R2,#R3,#R4,#R5,#R6
02480      IFGT      %,0
02490      POP       #R1
02500      ENDIF
02510      IFGT      %,1
02520      POP       #R2
02530      ENDIF
02540      IFGT      %,2
02550      POP       #R3
02560      ENDIF
02570      IFGT      %,3
02580      POP       #R4
02590      ENDIF
02600      IFGT      %,4
02610      POP       #R5
02620      IFGT      %,5
02630      POP       #R6

```

Listing 2 continued

Listing 2 continued

```

02640      ENDIF
02650      IFGT    %%,5
02660      POP      #R6
02670      ENDIF
02680      ENDM
02690 ;
02700 ;-----
02710 ; RPUSH
02720 ; Pushes 0 to 6 registers onto the stack
02730 ; Example: RPUSH BC,DE,HL,IX
02740 ;-----
02750 RPUSH MACRO #R1,#R2,#R3,#R4,#R5,#R6
02760 IFGT    %%,0
02770 PUSH    #R1
02780 ENDIF
02790 IFGT    %%,1
02800 PUSH    #R2
02810 ENDIF
02820 IFGT    %%,2
02830 PUSH    #R3
02840 ENDIF
02850 IFGT    %%,3
02860 PUSH    #R4
02870 ENDIF
02880 IFGT    %%,4
02890 PUSH    #R5
02900 ENDIF
02910 IFGT    %%,5
02920 PUSH    #R6
02930 ENDIF
02940 ENDM
02950 ;
02960 ;-----
02970 ; @SOUND -- Sound through built-in speaker
02980 ; If #tone & #dur are not specified, values
02990 ; default to current contents of B
03000 ;-----
03010 @SOUND MACRO #TONE,#DUR
03020 DEFINE @SOUND,68H
03030 IFGT    %%,0
03040 PUSH    BC
03050 LD      B,#DUR<3+#TONE
03060 ENDIF
03070 SVC     @SOUND
03080 IFGT    %%,0

```

```

03090      POP      BC
03100      ENDIF
03110      ENDM
03120 ;
03130 ;-----
03140 ; Invoke a TRSDOS 6 SVC
03150 ; If "check" is specified, exit
03160 ; through @ERROR if N2 flag is returned
03170 ; from TRSDOS.
03180 ;-----
03190 SVC     MACRO #NUM,#CHECK
03200 LD      A,#NUM          ;;A = SVC number
03210 RST     28H            ;;Perform SVC
03220 IFGT    %%,1          ;;More than one arg.?
03230 JR     Z,$!$?         ;;Go if no error
03240 LD      C,A            ;;Put error code in C
03250 LD      A,LAH         ;;@ERROR SVC number
03260 RST     28H          ;;Exit through @ERROR
03270 $!$? EQU     $       ;;Here if no error
03280 ENDIF
03290 ENDM
03300 ;
03310 ;-----
03320 ; @WRITE -- Write a record to a file.
03330 ; #UREC defaults to value in HL
03335 ; (unused if LRL = 256)
03340 ; #FCB defaults to value in DE
03350 ;-----
03360 @WRITE MACRO #UREC,#FCB
03370 DEFINE @WRITE,4BH
03380 IFGT    %%,0
03390 IFEQ    %%,2
03400 PUSH    DE
03410 LD      DE,#FCB
03420 ENDIF
03430 PUSH    HL
03440 LD      HL,#UREC
03450 ENDIF
03460 SVC     @WRITE,CHECK
03470 IFGT    %%,0
03480 POP     HL
03490 IFEQ    %%,2
03500 POP     DE
03510 ENDIF
03520 ENDIF
03530 ENDM
03540 ;

```

End

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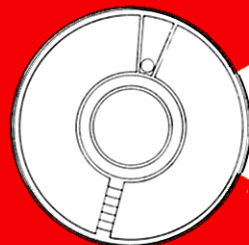
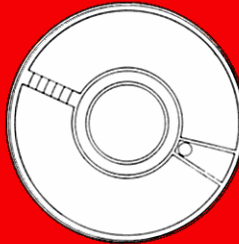
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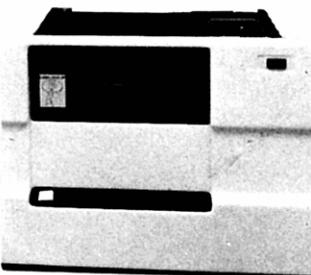
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A-Draw gives you reduction and enlargement, plus magnification.

Continued from p. 43

velop new drivers and add them to future releases. It took them two attempts to provide an adequate driver for my DMP 200 and a third to perfect it. They couldn't give me italics, which the printer doesn't support, but gave me the complete set of foreign and technical characters by graphically creating the ones my printer didn't have. The service is free.

A-Draw

A-Draw is as good as any stand-alone paint program I've used. You have free-hand drawing with a complete kit of brushes, along with functions for adding, positioning, and sizing lines and basic shapes. You can paint by spraying or by filling with a variety of preset patterns or ones you design. Although the program doesn't support color printing, you work with two four-color palettes on the screen. A-Draw gives you magnification for detail work and reduction and enlargement.

Cut-and-paste operations let you remove, copy, flip, turn, or reposition parts of your drawing. You can also save parts of it, as well as bring previously saved drawings into the one you're working on. A-Plus comes with a library of 100 drawings to get you started.

A Text function lets you create headlines. Each of the seven fonts supplied with the program comes in five styles, including shadow and outline, and you can combine styles to produce more. The font sizes are preset, but once you have the text on the screen, you can reduce or enlarge it.

At present, A-Draw does not support an external input device such as a joystick, pad, or mouse.

A-Plus keeps its own internal directories. If you go looking through an A-Plus work disk on the DOS level, you won't find the file you called "Letter to Aunt Mae" with the DIR command, nor much else you'd recognize. On the other hand, with 20 characters allowed within the program to name directories and documents, you have room for meaningful labels.

Graphically, A-Plus represents your subdirectories as loose-leaf binders and your individual documents as divisions inside them. You select a binder from a

stack of them on the right side of the screen, and an open binder on the left shows you the files it contains. Your binders and files are always available to you as menus, and it's easy to page through them to find what you need.

File-management utilities make using DOS for housekeeping practically unnecessary. Without leaving A-Plus, you can copy, move, rename, and delete files singly or in batches. You can copy and move files between binders on the same disk or from disk to disk. Because A-Plus automatically maintains an archive copy of each file, it's difficult to kill a file accidentally. To completely trash one, you must remove the second copy separately. Another utility lets you import and export text in ASCII format. Finally, you have utilities for formatting new work disks and for making complete disk backups.

Tandy Trouble

A-Plus does not support the Model 1000 keyboard. You won't be able to use your arrow keys, and you'll have to get used to using your numeric keypad for cursor movement only. Keys like home and insert are inoperable and become the 7 and zero keys, respectively. And you won't be able to type four characters at all, most seriously the backslash. Model 1200 and 3000 keyboards operate normally. (According to Savtek, the next upgrade will accommodate the Model 1000.)

Tandy printers, because of the way they handle line feeds, present a problem printing text and graphics together. With some of them, like my DMP 200, you can solve the problem by setting a DIP switch or a software switch. With others, the only solution will be to use a non-Tandy cable or modify a Tandy cable by cutting the wire to pin 14. Also, if you configure your system with the Mode LFOFF command, you'll have to turn DOS's line feeds back on before using A-Plus.

Conclusion

If I were looking at this product from the point of view of a professional writer's tool, I'd have reported several shortcomings. For instance, I'd complain about the way the program handles paragraph formatting, particularly double-spacing, or the lack of command macros. Within the context for which A-Plus is intended, however, I found little to fault: For the moment, the only illustrations you can use in A-Write are those created by A-Draw. If this is a failure, it's a small one.

A-Plus ETG is a fine piece of work, beautifully conceived and impressively executed. More than that, this package is a lot of fun to use. I suppose that could be dangerous. ■

More Interference Than Interface

★

Autodos 2.0 runs on the Model 1000/1200/3000 (128K) and requires one disk drive. The Software Company, P.O. Box 872687, Wasilla, AK 99687. 907-745-6267. \$34.95.

Autodos is a minimal shell that lets you issue DOS commands and start programs by menu selection. The memory-resident program maintains control of the operating environment so that when you complete a command or exit from a program, its menu screen returns in place of the DOS prompt. The screen displays the current drive and directory as well as the date and time.

The DOS menu lists system commands and utilities and prompts you for parameters when they are needed. The Run menu shows only the EXE, COM, and BAT files in the current directory. You select a command or program by entering a number.

If only it were so pat. The installation procedure is the crankiest I've ever used. It took three attempts to get the program properly installed. If that wasn't indication enough of trouble, the program didn't clear the screen on startup but laid its menu screen over what was already there.

The DOS menu's value is limited. It makes sense that, to execute an external command such as Diskcopy, Diskcopy.COM must be available. It seems to make sense that Autodos has to load Command.COM to process many internal commands. It makes sense until you discover that you can't look at a directory unless Command.COM is in the system path. On a floppy-disk system, that translates into slower operation and a lot of disk shuffling.

The DOS menu's shortcomings go deeper. Take the familiar example of a DIR command: From Autodos, you type a number and press enter. Then, in response to a prompt, you type the path name and switches, just as you would from the system prompt, and press enter again. Nothing in the Autodos prompt saves you from looking in the DOS manual if you don't know the command's syntax. (In fact, with other commands the prompts confused more than they illuminated.) And simple arithmetic shows a net savings of exactly one keystroke with Autodos. I wasn't impressed.

The Run menu is a bit more useful. If you can't remember where you've put a program or its exact spelling, you can browse through directories. Since the Autodos menu shows you only the executable files, the searching should be easier. Unfortunately, to change drives

and directories you first have to go to the DOS menu and use CHDIR, a clumsy way to go. Also, if a floppy disk does not contain system files (i.e., if you didn't format it with the /S switch), one program will not show up in the menu. With several of my disks, the ignored program was the primary program, rendering the disks unusable under Autodos.

The documentation does warn of this shortcoming. It also warns you not to run Basic or BasicA from Autodos, which puts all your Basic programs out of reach.

Autodos provides two other utilities. One reads a key or key combination you press and returns the ASCII codes and characters generated. The other displays the computer's character set.

On the face of it, Autodos's simple-shell concept seemed a good and useful idea. After I worked with it for a while, it proved anything but a convenience. The Software Company claims that version 2.1, the third revision I received in a six-week period, eliminates some of the problems I discussed. I was unable to install version 2.1.

—Harry Bee

Scrolling Nowhere



Omniscroll III/IV runs on the Models III/4 and requires one disk drive and either TRSDOS 1.3 or Newdos/80 2.0. Lyons Products, P.O. Box 272, Titusville, PA 16354, 814-827-9892. \$19.95.

If you happen to get the product-description flyer with Omniscroll III/IV, you find that it is a screen-scrolling utility for the Model III, or 4. However, Omniscroll III/IV's printed documentation says more about licensing problems than what the program does. The documentation does not even include the vendor's full address.

Moreover, Omniscroll's text files describe the program only as running on the Model III. I infer from the references to Model I TRSDOS and Newdos that the program also runs on the Model I. Since the disk is in Model III format, I don't know how the average user gets Omniscroll to a Model I disk. The on-disk documentation also makes no reference to Model 4 DOSes, so I don't see how it will run in the Model 4 mode.

The flyer claims that Omniscroll is good for animated graphics from interpreted Basic, and that it can serve as a foundation for windowing programs. Since the on-disk documentation does not address it, I fail to see how the program can help you with animated graphics unless you already have expertise in that area.

Omniscroll comprises two demonstration programs containing routines for selective scrolling. You can modify the routines and add them to your Basic programs. The routines scroll text up or down, right or left, and even diagonally within a selected window area created by your Basic program.

You scroll by setting Basic variables to certain values and calling a USR function to a machine-language subroutine, which your Basic program pokes into memory. Each USR-function call shifts the windowed area one space right, left, up, or down, so you do all scrolling by programming a For...Next loop for multiple calls of the subroutine.

Omniscroll also provides five flowchart text files, a documentation file, an assembly listing in text form, and two programs to print out the documentation or display it on your screen. To understand the flowcharts, you must imagine what they would look like compared to five flowchart patterns (without words) printed on the reverse side of the one-page printed documentation.

Omniscroll is strictly a hacker's program, requiring much analysis of the demos. The program's author does not follow good practices for developing reusable program modules; i.e., you cannot simply merge the routines for use in your programs. The routines do not use unique variable names, and they are numbered 220–1210 for one demonstration program and 60–1210 for the other.

The documentation tells you what the demos do and doesn't give you good programming information. You must dissect the demos for this. The author uses most of the documentation to describe his machine-language listing.

Omniscroll is an unprofessional product. Printing your own documentation is acceptable only if the program is free-ware or in the public domain. The Basic program that prints the documentation does not paginate or include a left margin; two more lines of Basic code would do this.

Omniscroll would better serve as a magazine article describing a programming technique. But for sale? Never.

—Thomas L. Quindry

Beginner's Gothic



Moonmist runs on the Tandy 1000/1200/3000 (128K) and requires one disk drive. Infocom Inc., 125 Cambridge Park Drive, Cambridge, MA 02140. 617-576-3190. \$39.95.

A letter from your old friend, Tamara Lynd, is a pleasant surprise in your otherwise harried life. After all, being an

attractive, celebrated, brilliant, young detective is demanding. So you smile, perhaps with a touch of envy, as you learn how Tamara's trip to Europe has turned suddenly into a storybook romance. "You'll never believe what's happened!" she writes. "I'm living in a castle in Cornwall, engaged to marry a British Lord!"

Her words bubble from the page as she tells you of the ancient castle, complete with its ghost and buried treasure; of her fiancé, Lord Jack Tresyllian; and of all the other stuffy, charming, scheming, sinister characters who populate her new life.

Lord Jack himself is no gadabout, she assures you, nor is the life of a British peer carefree. For one thing, Jack's former girlfriend drowned in the castle well soon after he broke off the romance because of her affair with his best friend. Her body was never found. And Jack inherited more than a castle and a title from Uncle Lionel. The family's debts forced Lord Jack to open the castle to the public to keep what remained of the family heirlooms from the likes of a too eager London antiques dealer.

Tamara's second letter, however, is another story. "Help!" she begins. Someone, it seems, is trying to kill her.

Moonmist has all the elements of a classic Gothic mystery fit for a Holmes or a Whimsey. If you've never tried interactive fiction, if you've been looking for a text adventure to begin with, Moonmist's Tresyllian Castle might be the place to start. The objectives are clear, the puzzles are well-defined, and none of them require the often frustrating and defeating leaps of logic for which adventure games are notorious.

However, gamers with any experience will be disappointed. Moonmist is too easy. Its setup—the set piece at the beginning that leads you by hand to the first hints and clues—goes too far. By the time the program leaves you on your own, the promising mystery has been reduced to the level of a pulp romance.

Moonmist offers four scenarios based on the same characters, plot, and setting. Each begins with the same opening sequence, varied only by the specific clues you are given. Each ends with a different villain, treasure, and rationale.

In theory, that's not a bad idea. In practice, because the four stories share not only the same premise but also the same map, props, and devices, it doesn't work. Once you've solved the first story, about all that's left for the other three is the drudgery of searching the same territory for only slightly different quarry. And nowhere is there the least hint that your character is in any danger.

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EXPRESS CHECKOUTS

for which Infocom games are famous, is not enough by itself to invent excitement and sustain interest. Moonmist is a passable demonstration of the techniques and possibilities of text adventures, but no more than that.

—Harry Bee

Up the Corporate Ladder

★★★★★

Managing for Success (formerly American Dream) runs on the Tandy 1000/1200/3000 (256K) and requires one disk drive. Blue Chip Software Inc., 6744 Eton Ave., Canoga Park, CA 91303, 818-346-0730. \$59.95.

Managing for Success is a corporate-management simulation that you can play for amusement or training. It comes on two disks with a softcover manual. The program is copy-protected; you must use disk A to start the game even if you've moved the program to a hard drive. Replacement copies are free for 90 days, \$22.50 thereafter.

Whether or not Managing for Success has educational merit, it is fun to play. It places you in a top management role in an initially profitable robot-manufacturing company. You control seven areas: engineering, material control, quality control, finance, production, marketing, and research. The program advises you of the state of the economy as play progresses: It tracks changes in GNP, inflation, hourly wages, and prime interest rate. Each simulation lasts six years, incrementing one month at a time. You can save a game in progress.

To help you make decisions about the business, you receive detailed reports from the various divisions. Such items as product-cost analysis, labor use, shipment forecasts, and income statements are available on demand and appear automatically every quarter. Memos also appear occasionally, reporting on progress in certain areas or warning about dangerous trends.

Managing for Success also has a capable graph-generating module that lets you custom-design graphs of any two items you choose. For convenience, certain graphs are available predesigned from the major departments.

The program's main screen displays the most important financial information, such as the revenue for the month, profit, units shipped, and projected cash balance. The only other item I wish this screen had is the previous month's data for comparison.

Various factors are within your control. In some departments (research and development, quality control, engineering), you can only increase or decrease

the budget. In others, you have more choices. In the finance department you can discount receivables to prompt those who owe you money to pay more promptly. You can also change the number of days you take to pay your creditors. In marketing, you can go from commissioned reps to salaried salesmen, increase advertising, run special promotions, or hire a market-research firm.

As you make changes, it can be difficult to make a profit on each unit because there is little margin on the robots and the competition's price forces you to remain at a reasonable level. Even gentle tinkering can catapult you into the red in a short time. As in the real world, sometimes it is hard to understand how to correct problems.

Many factors affect sales: the uniqueness of the product, quality, customer satisfaction, price, and promotion. It's a challenge to balance these factors. One nice feature is the worksheet section, which lets you test changes you are considering before you take any action.

I was confused by a discrepancy between the figure given as the break-even price of the robots in the marketing section and the unit cost of the robots as listed in the reports section. The logical conclusion would be that these figures should be the same. But one month I lost money with each sale (selling at less than my unit cost), yet the break-even price shown was below my selling price, indicating that I should have made money.

I found no explanation for this in the manual, but a call to the company's support line resulted in the answer. The break-even price is based on sales projections for the coming month, whereas the unit cost is based on actual sales for the previous month.

You can change many factors, from the name of the company to the initial bank-account balance, in Managing for Success from an auxiliary program. This feature keeps the simulation interesting after repeated plays.

The manual enhanced the educational aspect of the program. It is a complete introduction to the manufacturing business. The manual explains all terms found in the simulation, suggests strategies, analyzes each department's function, and emphasizes pitfalls. It is clearly written and designed.

The fun of Managing for Success is its complexity and the intertwining of all the factors causing the corporation's success or failure. Whether learning to master the game will also help in the real world is unknown, but it certainly helps you acquire perspective and insight into the complexities of the corporate environment.

—Wynne Keller

MS-DOS

Student Lotus

In a joint marketing agreement with the Lotus Development Corp., Addison-Wesley Publishing Co. has introduced the 1-2-3 Student Edition, a fully functional version of 1-2-3 customized for instructional applications. The package includes teacher and student manuals that provide lab exercises for college courses.

The software includes all the features and functions of the professional version, except that the Student Edition is limited to a 64-column by 84-row spreadsheet, while the full 1-2-3 has 256 columns and 8,192 rows.

The suggested retail price for the 1-2-3 Student Edition is \$49.95. Contact Addison-Wesley Publishing Co., Reading, MA 01867, 617-944-3700.

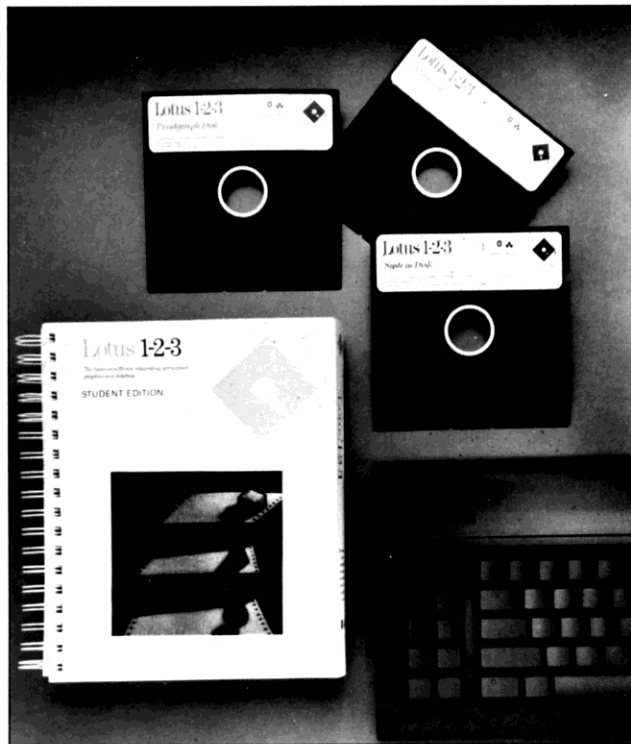
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Full Text and Graphics Layouts

Ingram Software Inc. is distributing White Science's desktop publishing package, Pagebuilder. Besides its text-handling abilities, the program offers advanced graphics abilities, including complete line drawings, charts, and graphs.

Pagebuilder can read data-interchange format (DIF) files from Lotus or other spreadsheet programs, data-exchange format (DXF) files from Autocad and other CAD programs, and ASCII text files from popular word-processing programs. It supports kerning and justification.

The program supports fully proportional fonts ranging from 3-72 points and can work with Canon- and Ricoh-engine laser printers; Calcomp, Kurta, and Summagraphics digitizing tablets; PC and Microsoft Mouse; and scanner input devices.



The 1-2-3 Student Edition has many features of its big brother.

Pagebuilder sells for \$495 from Ingram Software Inc., 2128 Elmwood Ave., Buffalo, NY 14207, 800-828-7250 (east), 800-847-6383 (west).

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Automate Your Business

Automate is an order-entry and billing software package that updates inventory and records sales, costs, margins, and markups.

When you make a sale, you type in the number sold and the stock number. The program checks the inventory and enters an item description, the price, tax, and the line and invoice totals. You can also enter payments on account, payments to vendors, and charges for merchandise, labor, or services. Once you've typed in the information, Automate writes the invoice, records the sale, and updates the inventory.

The program sorts the charge-invoice file chronolog-

ically and writes the entries to customer files. You then call up each file and make any necessary changes, and Automate writes and addresses individual customer statements.

Automate sells for \$149.95 and requires an MS-DOS machine with a color-graphics adaptor, 256K, and two disk drives. Contact RHM & Associates, 913 Helen St., Midland, MI 48640, 517-631-9334.

Circle 552 on Reader Service card.

Welcome Aboard, Captain Kirk

You are Captain James T. Kirk, of the starship Enterprise. While exploring an unmapped sector of space near the Great Transtellar Rift, the Enterprise comes under sudden attack. Your entire stock of raw protein substance (the base material of synthesized foods) is damaged, and you've got to beam down to the nearest class M (oxygen-nitrogen atmosphere) planet to find

food before your crew starves.

Thus begins Simon & Schuster Software's newest interactive fiction adventure. It's called The Promethean Prophecy, and it sells for \$39.95 from Simon & Schuster Software, One Gulf + Western Plaza, New York, NY 10023, 212-373-8882.

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Financial Help From J.K. Lasser

J.K. Lasser's *Your Income Tax* is a book and software package with 27 forms and schedules updated to meet the revisions in the income-tax laws. On-screen help information and references to paragraphs in Lasser's book should answer your questions.

By asking specific questions, the program determines which forms and schedules apply to your tax situation. Then it walks you through each step of the filing process. The screen displays a form 1040.

You can call up a calculator as you work or move back and forth between 1040 line numbers and related forms and schedules. The program automatically transfers your calculations to your 1040.

When you've finished, *Your Income Tax* computes your return and prints it directly onto your 1040. (It can print 27 other forms and schedules also.)

Your Income Tax sells for \$69.95 and requires 128K, a disk drive, and DOS 2.0 or higher. If you bought the program last year and still have proof of purchase, you can get the update for \$29.95.

J.K. Lasser's *Your Money Manager* is a home-accounting and small-business tool that helps organize and maintain financial records. It includes a check writer, financial statements, balance sheets, and budget reports.

The program features an on-screen, four-function cal-

How to Use 80 Micro Program Listings

Basic program listings in *80 Micro* include a checksum value at the end of each line. This value is the sum of the ASCII values of all characters and spaces in the line, excluding remarks. You can use these values to test the accuracy of your typing.

● Type in program code *exactly* as listed, omitting the indentations (when program lines continue to a second or third magazine line). The **** characters, checksum values, and comments may be omitted.

● Save the program in ASCII format with the command SAVE "file name",A.

● Load and run Checksum (see Program Listing). (For the Tandy 1000, change line 10 to: 10 CLS:LOCATE 2,25:PRINT "VERIFY CHECKSUMS ON PROGRAM" ** 3544.) The program will prompt you for the name of the file to be verified and give you the option of sending the line numbers and checksum values to the printer or to the screen.

When printing to the screen, Checksum lists 20 lines and then waits for you to press the enter key.

● Compare the displayed line numbers and checksum values with the checksums shown in the listing. Correct errors in lines having checksum values that don't match.

—Beverly Woodbury,
Technical Editor

Program Listing. Checksum.

```

10 CLEAR 1000:CLS:PRINT140,"VERIFY CHECKSUMS ON PROGRAM"      ** 3713
20 PRINT:PRINT:INPUT "Enter Name of File to verify";F$         ** 4245
30 PRINT:PRINT:PRINT "List Checksums to:"                      ** 3233
40 PRINT TAB(20) "<P>rinter";PRINT TAB(20) "<S>creen"          ** 3628
50 PRINT:PRINT:PRINT TAB(30);"? ";                             ** 2148
60 K$=INKEY$                                                    ** 726
70 IF K$="P" OR K$="p" OR K$="S" OR K$="s" THEN 80 ELSE 60     ** 3269
80 PRINT K$:IF K$="P" OR K$="p" THEN LP=1                      ** 2439
90 OPEN "I",1,F$:B$=CHR$(34)                                    ** 1521
100 IF EOF(1) THEN CLOSE:GOTO 390                               ** 2000
110 LINE INPUT#1,L$:L=VAL(LEFT$(L$,6))                         ** 2275
120 IF Z=2 AND L=0 THEN 100 ELSE Z=2                           ** 2089
130 A=VARPTR(L$):GOSUB 270:Q=PEEK(A)                           ** 2244
140 L$=PEEK(A+1):M$=PEEK(A+2):A=MS*256+L$:GOSUB 270           ** 3115
150 IF INSTR(L$,"") THEN GOSUB 280                             ** 2038
160 IF RIGHT$(L$,1)="" THEN IQ=Q:GOSUB 370                    ** 2514
170 FOR K=1 TO Q:P=PEEK(A):CS=CS+P:A=A+1:NEXT K                ** 2945
180 IF CS=0 THEN 100                                            ** 1131
190 IF CS<100000 THEN D$="-"                                   ** 1538
200 IF CS<10000 THEN D$="-"                                    ** 1481
210 IF CS<1000 THEN D$="-"                                     ** 1466
220 IF CS<100 THEN D$="-"                                      ** 1451
230 IF LP=1 THEN LPRINT "Line";L;D$;CS,:CS=0:GOTO 100         ** 3370
240 PRINT "Line";L;D$;CS:CS=0:X=X+1                             ** 2282
250 IF X=20 THEN X=0:PRINT TAB(30) "Press <ENTER> to continue."
    ELSE 100                                                    ** 4924
260 K$=INKEY$:IF K$<>CHR$(13) THEN 260 ELSE 100              ** 2705
270 IF A>32767 THEN A=(65536!-A)*-1:RETURN:ELSE RETURN        ** 3275
280 I=INSTR(L$,""):IQ=I-1                                       ** 1504
290 IF LEN(L$)=INSTR(L$,"") THEN 100                           ** 2095
300 LQ$=STR$(L):LQ=LEN(LQ$):IF LQ+2=>I THEN 100               ** 2839
310 Q1=INSTR(L$,B$):IF Q1>I OR Q1=0 THEN 370                  ** 2593
320 Q2=INSTR(Q1+1,L$,B$):IF Q2>I THEN I=INSTR(Q2,L$,"")      ** 3297
330 IF I=0 THEN RETURN                                          ** 1386
340 Q3=INSTR(Q2+1,L$,B$):IF Q3>I OR Q3=0 THEN 370            ** 2869
350 Q4=INSTR(Q3+1,L$,B$):IF Q4>I THEN I=INSTR(Q4,L$,"")      ** 3308
360 IF I=0 THEN RETURN                                          ** 1389
370 FOR I=IQ TO 1 STEP -1:C=ASC(MID$(L$,I,1)):IF C<33 THEN NEXT I
380 RL$=LEFT$(L$,I):Q=LEN(RL$):RETURN                          ** 2323
390 PRINT:PRINT"CHECKSUM/BAS now in Memory"                    ** 3248
400 PRINT "Reload the PROGRAM that you are working on? (Y/N)"; ** 4890
410 INPUT Q$:IF Q$="P" OR Q$="y" THEN CLS:LOAD F$              ** 2967

```

End

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1. ☐ I own an MS-DOS, IBM compatible system. 3. ☐ I'm interested but have no immediate plans to purchase.
2. ☐ I intend to purchase. 4. ☐ Not interested.
- B. On a scale of 1 (no interest) to 5 (great interest), please rate your interest in seeing the following types of programs published in 80 Micro:
1. Business applications 4. Money management applications
2. Science/math applications 5. Games
3. Home management applications 6. Programming Utilities
- C. Excluding yourself, how many people read your copy of 80 Micro?
1. ☐ One 3. ☐ Three 5. ☐ Five or more
2. ☐ Two 4. ☐ Four
- D. What type of TRS-80/Tandy Computer do you own? Check all that apply.
1. ☐ Model I 6. ☐ Model 16/16B/6000 11. ☐ Model 2000
2. ☐ Model III/12 7. ☐ Model 100/200 12. ☐ Model 3000
3. ☐ Model III 8. ☐ Model 600
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1. ☐ Less than 1 year 4. ☐ 3-4 years
2. ☐ 1-2 years 5. ☐ More than 4 years
3. ☐ 2-3 years
- F. Do you subscribe to an information utility, such as Compuserve, Dow Jones News Retrieval, etc.?
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1. ☐ Yes 2. ☐ No 3. ☐ Don't know
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2. ☐ At home for business 5. ☐ For math/science applications in any location
3. ☐ At work
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102 107 112 117 122	252 257 262 267 272	402 407 412 417 422	552 557 562 567 572
103 108 113 118 123	253 258 263 268 273	403 408 413 418 423	553 558 563 568 573
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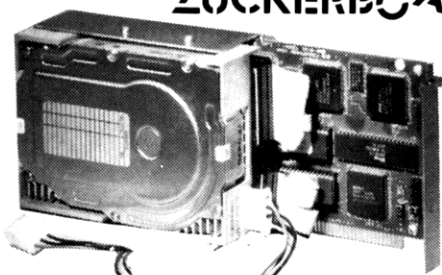
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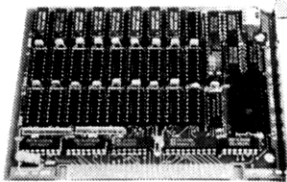
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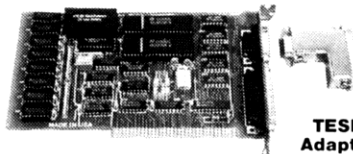
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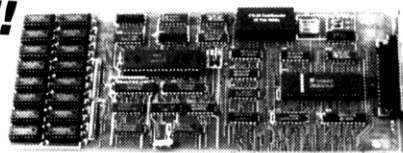
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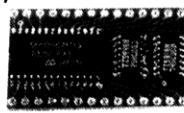
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Your Money Manager can prepare, display, and print reports of your financial position at any time. A variety of graphs help you analyze current and projected trends. If you use the program to maintain accurate records throughout the year, you can enter the information into *Your Income Tax*.

Your Money Manager sells for \$89.95 and requires 128K, one disk drive, and DOS 2.0 or higher.

Contact Simon & Schuster Software, One Gulf + Western Plaza, New York, NY 10023, 212-373-8882.

Circle 554 on Reader Service card.

Financial Forecasting

Taxcalc's Business Planning Model for Forecasts and Projections is a spreadsheet template to help CPAs prepare cash flow, break-even analysis, budgeting, and other prospective financial statements. It uses what-if analysis that lets you compare several scenarios based on different assumptions about the future.

The template creates prospective financial statements that conform to the latest format and data-collection standards (effective Sept. 1, 1986) of the American Institute of Certified Public Accountants.

Business Planning Model for Forecasts and Projections lets you create monthly, yearly, or quarterly forecasts within a 12-month period. A goal-setting area helps you determine break-even points in an analysis, and a decisions area lets you manage surplus and deficit financing.

The template works with Lotus's 1-2-3 and any other spreadsheet that loads 1-2-3 files on an IBM PC or compatible. You can use the 1-2-3 graphics to create a graph of your analysis.

Business Planning Model for Forecasts and Projections

requires two disk drives and 640K and sells for \$250. Contact Taxcalc Software Inc., 4210 West Vickery Blvd., Fort Worth, TX 76107, 817-738-3122.

Circle 556 on Reader Service card.

Statistical Forecasting

Walonic Associates has released a forecasting module that adds exploratory data analysis, time-series forecasting, and quality-control analysis to Statpac Gold, the company's statistical-analysis software.

The module provides graphics for time plots, 4253HT robust-smoothed time plots, box plots, aggregate box plots, spread-versus-level plots, and autocorrelation function plots. The Statpac Gold package contains three regression-modeling techniques. The module adds 11 forecasting methods: seven smoothing techniques, two methods of decomposition, and two ARIMA techniques.

The smoothing techniques include moving averages, exponential smoothing, harmonic smoothing, and the Holt's and Winter's methods. The module also provides Census X-11 and SABL (robust) decomposition methods for long-term seasonal forecasting, adaptive-filtering, and Box-Jenkins ARIMA programs.

Statpac Gold sells for \$595. Add \$195 for the forecasting module. Contact Walonic Associates, 6500 Nicollet Ave. South, Minneapolis, MN 55423, 800-328-4907.

Circle 558 on Reader Service card.

Hiring Software

The Logical Decision Assistant helps employment interviewers select the most qualified applicant by focusing attention on the five most critical elements of a position and comparing applicants to those elements. You choose the elements, which can include such qualities as education, communication skills, accuracy, and experience.

The program requires 256K and sells for \$395. A demonstration disk sells for \$25. Contact Young Associates, 15720

Winchester Blvd., Los Gatos, CA 95030, 408-395-6441.

Circle 559 on Reader Service card.

Hard-Disk Security

Version 4.0 of the Onguard system operates as an extension of DOS, regulating each user's access to a MS- or PC-DOS hard drive. Onguard gives one person control over who uses the hard disk and what data and programs each user can access. It also provides a comprehensive audit trail, allowing the system manager to monitor hard-disk use.

Onguard 4.0 features revised documentation, drive A boot protection, the Privacy Plus encryption program, and the Master Key encryption-key recovery program.

Privacy Plus lets you encrypt your files and directories. Using English commands or full-screen pop-up menus, you can lock and unlock your data. Master Key lets the system manager decrypt encrypted data without disclosing the Master Key.

Onguard sells for \$295 from United Software Security Inc., 8133 Leesburg Pike, Vienna, VA 703-556-0007.

Circle 557 on Reader Service card.

Program-Development Screens

High Screen 3.4 is an enhanced program-development tool you can use with all programming languages. Its features include sophisticated screen generation; automatic field checking; and help, window, and pull-down menu management.

You can choose a field-by-field or full-screen mode for each data-entry screen, scroll vertically within a zone, and call High Screen functions from batch files or DOS.

High Screen does not generate code; it creates language- and program-independent screens and uses a resident module to interface these screens with the applications you've developed. Therefore, you can change screens without modifying the program, and you can use the same screen developed

while writing an application in one language to rewrite the program in another.

High Screen 3.4 is royalty free and not copy-protected. It sells for \$129, and registered owners of earlier High Screen versions can upgrade for \$20.

The High Screen Unloader uses a hierarchical structure to let you selectively unload resident programs from RAM. It's available for \$20 to High Screen users.

Contact Softway Inc., 500 Sutter St., Suite 222, San Francisco, CA 94102, 415-397-4666.

Circle 555 on Reader Service card.



The Mouse Base provides a non-skid surface on which to use your mouse.

Etc.

Mouse Base

Mouse Base is a durable nylon and sponge-rubber non-skid mouse pad that improves tracking and protects the mouse and the desk. It measures 11 $\frac{3}{4}$ by 8 $\frac{1}{2}$ inches and sells for \$9.95 from Computer Coverup Inc., 2230 South Calumet, Chicago, IL 60616, 312-326-3000.

Circle 563 on Reader Service card.

PC Law

Lawlink is the American Bar Association's law-office software program that integrates several legal programs into a single-menu system. It also includes a communications package.

Lawlink lets lawyers create a series of customized menus and then switch between

such programs as a word processor and a data base. The communications element provides access to ABA/net and legal data-base services.

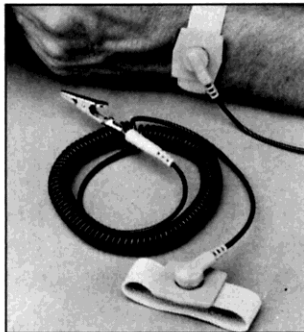
ABA members can buy Lawlink for \$60. It's \$120 for non-members. Contact the Law Office of the Future Project, American Bar Association, 750 North Lake Shore Drive, Chicago, IL 60611, 312-988-5026.

Circle 560 on Reader Service card.

Star Gazing

Skyshot is a program that determines ground azimuths from observations of celestial objects. You plug in your measurements (from up to eight observations) and ephemeris values, and the program calculates the azimuth bearing.

Skyshot lets you choose any of three celestial observations methods: direct-altitude observation, hour-angle observation of sun, or polaris observations. The program



A wrist strap to prevent static charges.

works independently or as an accessory to MTI Software's Series 800, Series 2000, or Series 3000 survey packages.

MS-DOS and CP/M versions of Skyshot sell for \$125 from MTI Software, P.O. Box 1659, 600 B St., Santa Rosa, CA 95402, 707-523-1600.

Circle 567 on Reader Service card.

Get a Charge Out of This

Scooter Products' Anti-Static Wrist Strap is an elas-

tic fabric wrist band that you wear while working with sensitive chips and circuits to prevent static charges from affecting them.

The strap has a conductive inside surface connected to a 1-megohm resistor (for the wearer's protection) that, in turn, connects to a 10-foot, telephone-type coiled cord. A banana plug at the other end of the cord inserts into an alligator clip that you attach to a conductive work surface.

The Anti-Static Wrist Strap comes in small (Model SS801-S) and large (Model SS801-L) and sells for \$14.95 from Scooter Products, Ohm/Electronics Inc., 746 Vermont St., Palatine, IL 60067, 800-323-2727 (in IL, 312-359-6040).

Circle 571 on Reader Service card.

Spike Out

The model MPS(22)-2 Portable Computer Protection System insulates your portable computer from ac and modem line spikes, electrical

noise, RFI, and static. The unit provides standard and CEE-22 electrical sockets, a standard phone RJ-11 modular socket/plug, and a static-discharge plate.

The MPS(22)-2 sells for \$185 from Electronic Specialists Inc., 171 South Main St., Natick, MA 01760 800-225-4876.

Circle 564 on Reader Service card.

232 x 2

The Black Box 232 Line Booster receives and retransmits the 12 most commonly used signals of the RS-232C interface. This doubles the RS-232's specified 50-foot signal-transmission distance. The device is data-rate and data-format transparent, and you can power it from the interface or a detachable power supply.

The Centronics Line Booster does all that the Black Box does, and it accommodates the Centronics-compatible printer interface. It supports the interface's 16 most common signal lines and lets you

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80micro

Reader Service

TO RECEIVE MORE INFORMATION ON THE PRODUCTS AND SERVICES IN THIS ISSUE, PLEASE TURN TO READER SERVICE CARD.

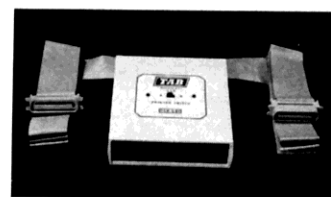
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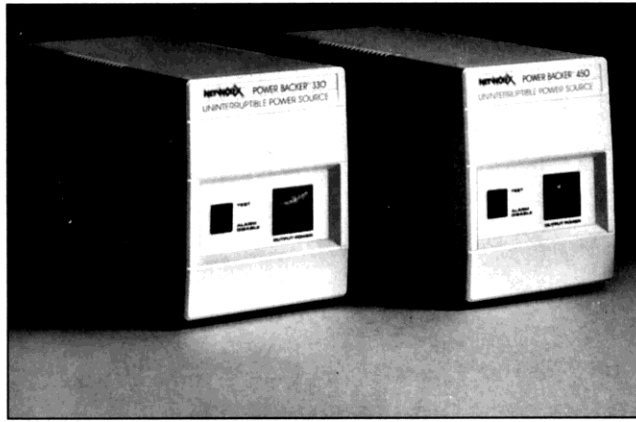
double the cable length to 10-15 feet.

Either device sells for \$99, and you install it in the center of the RS-232 or Centronics cable. Contact Black Box Corp., P.O. Box 12800, Pittsburgh, PA 15241, 412-746-5500. Circle 562 Reader Service card.

Line Backers

The Networx Power Backers 330 and 450 provide uninterruptible power to protect computer data and memory against blackouts and power sags. They also contain fast-response circuitry that guards against surges, spikes, and radio-frequency and electro-magnetic interference. During a power failure, the Model 330 can restore power within 2 milliseconds, and the Model 450 can do so within 4 milliseconds.

Depending on how a system is configured, the Power Backers can maintain power for up to 30 minutes, giving you enough time to shut



Networx's Power Backers provide uninterruptible power.

down your system. The Power Backer sounds an alarm 2 seconds before its battery is exhausted.

The Model 330 provides a peak-output current of 6 amps and sells for \$499. The Model 450 provides a 9-amp peak-output current and sells for \$799. Contact Networx, 203 Harrison Place, Brooklyn, NY 11237, 718-821-7555.

Circle 569 on Reader Service card.

Micro Disks

Maxell's MF2-HD high-density 3 1/2-inch, micro-floppy disk features 2-megabyte (MB) unformatted or 1.6MB formatted capacity. The disks use a thin coating of high-coercivity epitaxial magnetic material and are housed in a precision cartridge to reduce output fluctuation. They are software compatible with

1MB, 5 1/4-inch disks and 1.6MB, 5 1/4-inch and 8-inch disks.

A box of 10 MF2-HD disks sells for \$69.95. For more information contact Maxell Corp. of America, 60 Oxford Drive, Moonachie, NJ 07074, 201-641-8600.

Circle 566 on Reader Service card.

Bus Terminal

Bizcomp's external Intellimodem 2400 and its internal Intellimodem 2400 PC are fully Hayes-compatible, 2,400-baud modems that include a bus so you can plug in future modifications. Both modems are also compatible with Bell 103/212/V.bis specifications and support 1,200 and 110-300 baud communications. They include audible call-progress monitoring with adjustable volume controls and loop-through RJ-11 connectors for connecting telephone sets.

These modems also feature

Circle 152 on Reader Service card.

NEW PRINTERS ADDED! FIND YOURS BELOW.

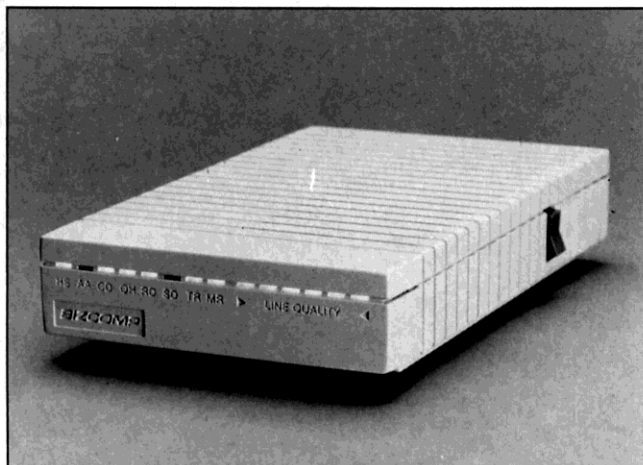
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PRINTER MAKE, MODEL NUMBER Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.	RIBBON SIZE Inches by Yards	NEW CARTRIDGES From the various manufacturers or made in our own shop. Ready to use.	RELOADS You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.	INSERTS EZ-LOAD™ DROP IN. NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included.
C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP-IMAGEW	1/2 x 18	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
IBM PROPRINTER (Standard Paper) (4201)	7/16 x 20	\$18/2 \$51/6 \$ 98/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
PC (Standard Paper) (5152)	1/2 x 20	\$14/2 \$36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH				
Carbon Film - DWP 210, DIABLO HYTYPE II Black (1445)	5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$12/3 \$45/12 \$252/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419)	1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72
Red, Green, Blue, Brown Colors (1419)	1/4 x 130	\$21/3 \$72/12 \$414/72	\$6 ea 3-11 \$5 ea 12 or more	\$24/6 \$42/12 \$234/72
Fabric (Long Life), DWP 210, DIABLO HYTYPE II Black (1458)	5/16 x 17 NOT EZ-LOAD 1/4 x 25	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1449)		\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72
DMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)	Inker Loop	\$18/2 \$51/6 \$ 96/12		
DMP-200, 120, (430 Inserts & Reloads Only) (1296) (1483)	1/2 x 20	\$20/2 \$57/6 \$108/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP-400-420, LP VI-VIII, PANASONIC KXP-130-1093 (1418)	5/16 x 14	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP-500 (130 Inserts & Reloads Only) (1236) (1482)	1/2 x 20	\$22/2 \$63/6 \$120/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP-2100, TOSHIBA P1340-1350-1351 (1442)	1/2 x 20	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP-2200, C ITOH 3500 (1233)	1/2 x 52	\$35 each	\$18/1 \$16 ea 2 or more	\$30/3 \$57/6 \$108/12
LP III-V, CANON A 1200 (New Only) (1/2 x 5) (1414)	1/2 x 15	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
EPSON LQ 1000				
MX-FX-RX 70-80-85, LX 80-90 (5/16 x 7)	1/2 x 18	\$22/2 \$63/6 \$120/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
MX-FX-RX 100-185-286, LQ 800 (1/2 x 18) LQ 1500 (1/2 x 14)	1/2 x 20	\$14/2 \$36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DX 20-35 Carbon Film (Multistrike), OLIVETTI ET-121-221	1/2 x 30	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
	5/16 x 290	\$21/3 \$72/12 \$414/72		
NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only)	5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72
- 5500-7700 (Can Reload Most Types)	NOT EZ-LOAD 1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72
- Fabric - 2000-3500 (Can Reload All)	1/2 x 14	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72
- 5500-7700 (Can Reload All)	1/2 x 13	\$15/2 \$42/6 \$ 78/12	\$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72
Pinwriter P1-P2-P6, P-5 (1/2 x 14)	1/2 x 20	\$25/2 \$69/6 \$126/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
P3-P7	1/2 x 27	\$30/2 \$84/6 \$156/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
OKIDATA Pacemark 2350-2410 Black				
Microline 182-183-192-193 (Call for 292-293 prices)	1/2 x 100	\$25 each	\$20/1 \$18 ea 2 or more	\$36/3 \$132/12 \$720/72
ML-80-82-83-92-93 (Call for ML-84 Prices)	Inker Loop	\$20/2 \$57/6 \$108/12		
MANNESMAN-TALLY MT-160, RITEMAN INFORUNNER (Inker Loop)	1/2 x 16	\$21/6 \$63/12 \$198/72		
MT-180-290	9mm x 11	\$19/2 \$54/6 \$102/12		
-SPIRIT 80 (SP80) COMMODORE 1526 (Multistrike)	9mm x 13	\$20/2 \$57/6 \$108/12		
PANASONIC KXP-1080-1090-1091-1092-1592-1595	1/2 x 35	\$16/2 \$45/6 \$ 84/12		
BROTHER HR-15-25-35	Inker Loop	\$20/2 \$57/6 \$108/12		
COMREX DX-15, II	5/16 x 82	\$18/3 \$60/12 \$342/72		
	5/16 x 17	\$15/2 \$42/6 \$ 78/12		

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The Intellimodem 2400 is fully Hayes-compatible.

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The Intellimodem 2400 and 2400 PC sell for \$599 each and include a telephone network cord, user guide, and two-year limited warranty. For more information contact Bizcomp Corp., 532 Mercury Drive, Sunnyvale, CA 94086, 408-733-7800.

Circle 561 on Reader Service card.

Six Line Filters

PMC Industries' six ac line filters suppress noises from 55-70 dB and high-voltage transients/surges from line to line and line to ground. The units also feature 6-foot shielded line cords (where used), filters enclosed in individual modules, lighted on/off switches, resettable circuit breakers, and multiple filters.

Some units have suppression banks of outlets.

Prices for these line filters range from \$79.95-\$249. They are available from PMC Industries Inc., 6335 Ferris Square, San Diego, CA 92121, 800-242-9353.

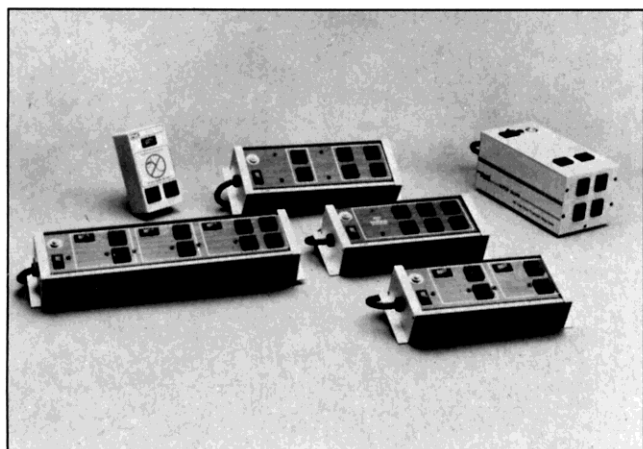
Circle 570 on Reader Service card.

Sidekick

The System Sidekick mounts on the side of your computer work station to hold the system unit vertically and give you more work space. Sidekick's steel frame can be adjusted from 4 to 7 inches and has a textured-putty finish.

It comes with a clamp-mounting system, and screw mounts are available. The System Sidekick sells for \$79.95 from Lintek Computer Accessories, 426 North Park NE, Grand Rapids, MI 49505, 800-822-9110.

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New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

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The WP key is a simple way to write-protect your disks: a plastic strip that you stick into the corner of a 5¼-inch disk to fill the write-protect slot. When you want to remove the protection, just slide the key out—no tearing a sticky tab and scraping off the leftover pieces, no paper tabs lost inside you disk drive, no accidentally damaged disks.

Want to protect the same disk again? Slide the key back in. They're reusable and guaranteed for life. A package of 10 keys sells for \$1.39, plus 50 cents for shipping, which covers up to five packages. Write to Near Future Computer Co., P.O. Box 1726, Walla Walla, WA 99362.

Circle 568 on Reader Service card.



WP key write-protection.

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Shhh! Top Secret

The CIA has nothing on 80 Micro readers (as far as I know). Your cryptography programs represented nearly every cipher known to science. The ones I missed were Bacon's thinking-digital-in-the-17th-century binary cipher and the infamous Nihilist transposition.

Transpositions that mix up plaintext weren't popular at all. Steve Woicik (Turlock, CA) sent the only one, but he gets a bumper sticker anyway for the nicest-looking display.

Naturally, substitution ciphers were well represented. Your favorite method, though, was displacement. In a displacement, you put the characters you want to deal with on a wheel and, to find a character to stand for the original, spin the wheel. The trick is how you spin it. The bravest schemes, which put a different spin on each character, depend on keys, New Math, and purely arbitrary factors like the phases of the moon.

T.J. Reibold's (Superior, WI) big-league math includes multiplication by a matrix. The ciphers you liked best, however, use a key modified by the character's position in the file.

Evan Hand (Loogootee, IN) used two keys for extra security and then each character generated to make a new key for the next (see Program Listing 1). His program demonstrates XOR, another favorite device computers bring to cryptography. XOR helps hide the regularity of mathematical formulas and is naturally reversible, restoring the original the second time you apply the key. Evan also used the Model 4's System command to direct his program's output, as well as CVI and MKI\$ to process two characters at a time.

Another cipher fit for a computer uses a "non-repeating key"—a sequence like the one RND produces. Professionals consider it virtually unbreakable, and I hear the KGB likes it.

John Higgins (Davenport, IA) used this device in a nifty one-liner for Color Computers (see Program Listing 2). Color Basic lacks XOR, so John made one out of Not, And, and Or. To restore the plaintext, you must reproduce the random sequence by using the key to "seed" the pseudo-random-number generator. In Color Basic, a negative argument in the RND function plants the seed.

A good cipher considers the medium as well as the method. Gary Clark (Bethesda, MD) pointed out that killing a file deletes it from the directory but leaves it

otherwise intact. He wrote over the original file by opening it for sequential input and output at the same time. It works! In random access (the ordinary way to overwrite a file), the unused portion of the last record is dangerous. If it has the simple pattern of a newly formatted disk when you apply your cipher, you leave an obvious clue.

David Gish (Memphis, TN), aware of the trap, had his program (see Program Listing 3) look for the standard end-of-file marker (26) and stop. David also allowed for a long, non-numeric key, on which he used Basic's single-precision notation to apply the high-power math to get a seed for his non-repeating key. Since TRSDOS Basics do not have a function for seeding the RND routine with a predetermined value, David poked the seed directly into low memory. He avoided string manipulation and Model III garbage collection by poking the random-access buffer. Nice job.

Lost and Found

I've lost something in an ordinary text file produced by a no-frills text editor—just everyday text and a few carriage returns. Help me find it. We'll trade T-shirts and bumper stickers for the

cleverest search routines. Include any features you've seen in fancy word processors, such as searches by word or character, wild-card searches, search and destroy, and search and replace. Fit your solution into two lines of Basic and have fun.

The Rules:

1. Write your solution(s) in any TRS or Tandy Basic, except Pocket Computer Basic.
2. This month's entries must reach us by May 15, 1987. This doesn't give everyone the same amount of time, we know, and we apologize to our overseas readers especially.
3. This month's winners will appear in the August 1987 issue.
4. Employees of CW Communications are not eligible.
5. Send your entry to: 80 Micro, Fine Lines, 80 Elm St., Peterborough, NH 03458. We cannot return entries.
6. Specify your T-shirt size. Bumper size not required. ■

Harry Bee is a free-lance writer, puzzle creator, programmer, and dreamer. Contact him at P.O. Box 567, Cornish, ME 04020.

Program Listing 1. Evan Hand's doubly keyed Model 4 combination.

```
10 CLS:DEFINT A-Z:L$=CHR$(13):P$="link *do *pr":WHILE S$="" OR D$="" OR (K OR M)
<1 OR (K AND M)=0:INPUT"Source file >";S$:INPUT"Cipher file >";D$:INPUT"Key, Cipher key (1 - 32767)>";K,M:WEND:INPUT"Copy to printer (Y/N)>";Y$
20 PRINT L$"Processing: "S$:OPEN"D",1,S$,2:FIELD 1,2 AS A$:OPEN"D",2,D$,2:FIELD 2,2 AS B$:WHILE LOC(1)<LOF(1)-1:GET 1:V=CVI(A$):V=V XOR M:M=(V-M) XOR K:LSET B$=MKI$(V):PUT 2:WEND:CLOSE:N$="reset *do":PRINT L$"Reading: "D$:IF Y$<>"Y" THEN P$=N$
30 K=M=0:WHILE (K OR M)<1 OR (K AND M)=0:INPUT"Key, Cipher key (1 - 32767)>";K,M:WEND:PRINT"OPEN"D",1,D$,2:FIELD 1,2 AS A$:SYSTEM P$:WHILE NOT(EOF(1)):GET 1:V=CVI(A$):V=V XOR M:M=((V XOR M)-M) XOR K:PRINT MKI$(V);:WEND:CLOSE:PRINT L$"Done!" :SYSTEM N$
```

Program Listing 2. John Higgins's CoCo cryptographer.

```
0 CLS:INPUT"IN,OUT,KEY";I$,O$,K:C=RND(-ABS(K)):OPEN"D",#1,I$,1:FIELD#1,1 AS A$:OPEN"O",#2,O$,CLOSE 2:KILL O$:OPEN"D",#2,O$,1:FIELD#2,1 AS B$:FOR I=1 TO LOF(1):GET#1,I:A=ASC(A$):C=RND(31):LSET B$=CHR$(NOT(AANDC)AND(AORC)):PUT#2,I:PRINT#D,B$;:NEXT:END
```

Program Listing 3. David Gish's complete cryptographer for the Model III.

```
1 CLEAR500:DEFINTJ-N:CLS:PRINT"CIPHER 1.0":INPUT"File, Key";F$,K$:X=1:J=VARPTR R(X):FORN=1TOLEN(K$):X=X*ASC(MID$(K$,N,1))+N:POKEJ+3,128:NEXT:FORN=0TO2:POKEN+16554,PEEK(N+J):NEXT:OPEN"RO",1,F$:L=LOF(1):IFL=0,CLOSE:ENDELSEPRINT"Length=" "L"sector"
2 FIELD1,1ASAS:J=VARPTR(A$):J=PEEK(J+1)+256*PEEK(J+2):DEFNFX(A,B)=(AORB)ANDNOT(AANDB):FORN=1TOL:GET1,N:PRINT@192,"Sector:"N;:FORK=0TO255:M=PEEK(J+K):IFM=26THENPUT1,N:CLOSE:ENDELSEM=FNX(M,RND(255)):IFM=26THEN3ELSEPOKEJ+K,M
3 NEXT:PUT1,N:NEXT:CLOSE
```

End

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PC Magazine
March 10, 1987



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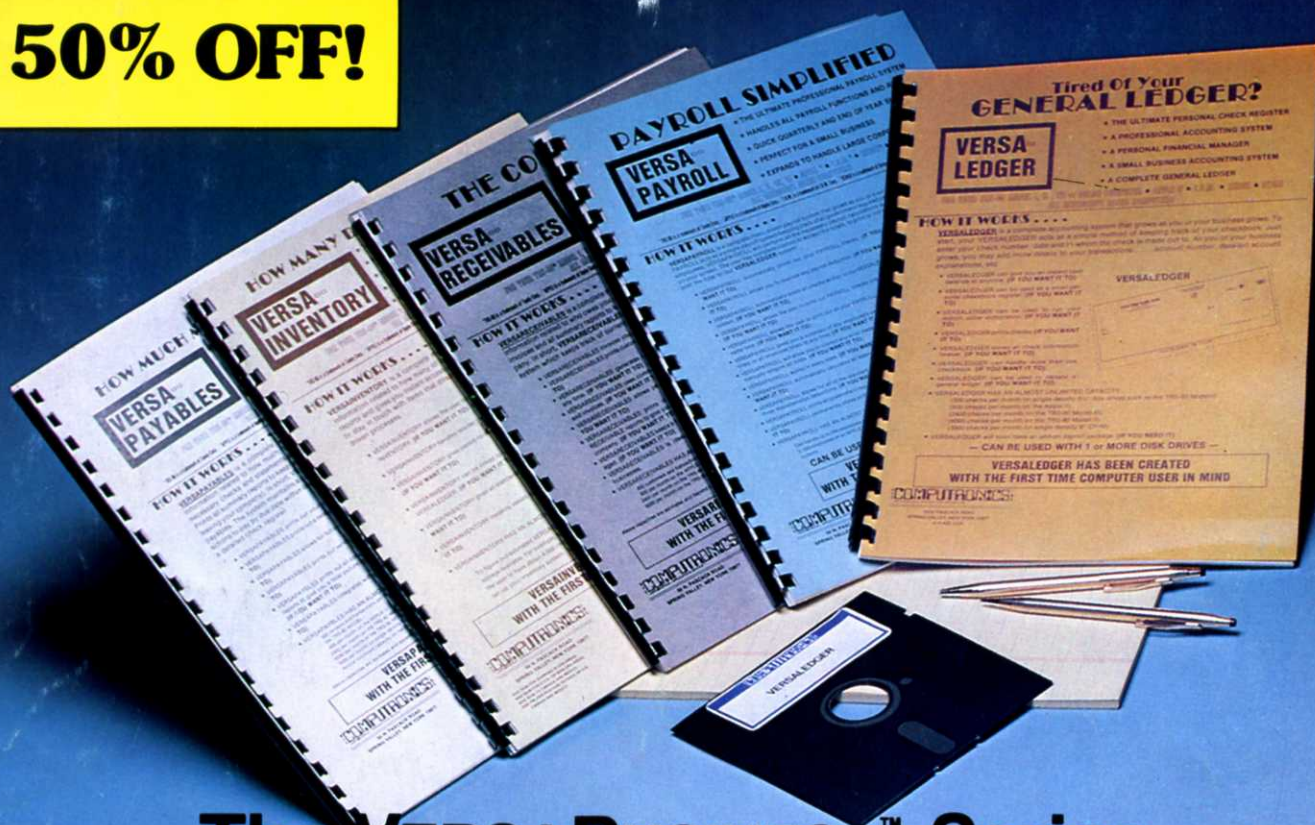
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